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University of Texas Bulletin
No. 2832: August 22, 1928

THE POSSIBILITIES OF COTTON MANUFACTURING IN TEXAS

By

CHARLES J. RUDOLPH GROSSMANN
Industrial Engineer

Bureau of Business Research
Business Research Monograph No. 1

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PUBLISHED BY THE UNIVERSITY FOUR TIMES A MONTH, AND ENTERED AS SECOND-CLASS MATTER AT THE POSTOFFICE AT AUSTIN, TEXAS, UNDER THE ACT OF AUGUST 24, 1912

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The benefits of education and of useful knowledge, generally diffused through a community, are essential to the preservation of a free government.

Sam Houston

Cultivated mind is the guardian genius of democracy. . . . It is the only dictator that freemen acknowledge and the only security that freemen desire.

Mirabeau B. Lamar

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PREFACE

This study was undertaken as a result of a general demand for an evaluation of the possibilities for profitably expanding the cotton textile industry in Texas. The business is highly competitive so that any analysis must be comparative to be of real value. The fundamental points of comparison with New England and the Southeast—the two important textile manufacturing centers—indicate that the industry in Texas may be considerably expanded if the expansion is done judiciously.

For the benefit of those who are not familiar with the cotton textile industry, an introductory section describing the manufacturing processes and the marketing organizations is presented. The second section is largely concerned with the causes of the southward shift of the industry. Manufacturing conditions in Texas and the present status of the cotton textile industry in the State are treated in the third section, while certain conclusions with respect to the possibilities of the development of the industry are given in the final section.

Mr. Charles J. Rudolph Grossmann, the author, wishes to express his appreciation of the cordial coöperation received from the executives of the cotton mills of Texas.

A. B. Cox, *Director.*

August, 1928.

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THE POSSIBILITIES OF COTTON MANUFACTURING IN TEXAS

INTRODUCTION

Purpose and Scope of the Report

The State of Texas has experienced in the first quarter of the twentieth century a remarkable economic growth. This has been due mainly to its agriculture and to its mineral resources. For the last ten years, however, popular interest has begun to turn toward manufacturing; that this interest should have centered on the spinning and weaving of cotton is but natural when it is remembered that cotton is the State's most important crop. This study has been undertaken to describe the present stage of the cotton manufacturing industry of Texas and to gauge its future possibilities.

Cotton goods are easily moved from one part of the country to the other. The future of the Texas cotton industry, therefore, depends to a large extent upon the conditions which rule the industry nationally. For this reason the first chapter of this bulletin will describe the history and the present economic status of the industry in the Nation; the second chapter deals with the Texas industry proper. It is only by keeping national as well as Texas conditions in mind that it is possible to arrive at sound conclusions.

The first part is based on several years observation in New England and on a short period of study in the Southeast; the figures used, however, are mostly Government figures. The second part is the result of a survey conducted early in 1928 in Texas. The power companies operating in Texas have supplied the information as to their lines and rates. The data on freight rates were secured from the Interstate Traffic Company and their representative in Dallas, who acts as traffic counsel to the Texas Cotton Manufacturers Association.

The Manufacturing Process

The manufacturing of cotton cloth consists of three major operations: spinning, weaving, and finishing.

Spinning is the combination of cotton fibers into yarn; weaving is the combination of yarn into gray cloth; finishing is the generic term including all the processes designed to bleach, dye, print, or coat gray cloth.

The majority of the cotton manufacturing plants in the United States do both spinning and weaving, although there are mills concerned with spinning only. Clients of the spinning mills are the

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knitting and the tire industries. Some few firms finish their own gray cloth but this bulletin will concern itself only with the cotton manufacturing industry proper, which includes spinning and weaving.

Spinning of cotton consists of the following operations: Opening and cleaning, carding, combing (for fine yarn only), drawing, roving, and spinning.

The cotton as it comes to the mill is in densely matted layers. The opening process consists in loosening the cotton, in mixing so as to get uniformity, and in cleaning by removing dirt and particles of leaves, burrs, and other trash. When the cotton leaves the opening machines, it is called a "lap."

Carding, the next general operation, is largely a cleaning process for the removal of "motes," "nep," and short fibers. It also does considerable parallelizing of fibers. Carding is done by two drums revolving against each other; these drums are covered with a cloth in which are thousands of knee-shaped points projecting about a quarter of an inch. When the cotton leaves the cards, it is known as a "sliver."

Drawing performs the two important functions of parallelizing the cotton fibers and of equalizing the diameter or weight of the sliver. The "slivers" of cotton delivered by the card are taken between sets of rolls, each following pair revolving faster than the previous one, so that the fibers are slid along each other into a parallel position, and the cross-section weight is much reduced. In order to make the slivers even in density, several of them are laid together ("doubled") at each succeeding passage through a drawing machine. There are usually three such passages.

The sliver goes from the drawing frame to the fly frames. They continue the processes of fiber parallelization and weight equalization but the primary function is the attenuation and winding of the product on a bobbin. In order to effect the attenuation, the sliver is given some twist as it proceeds through the machines to make it hold together. The number of successive machines used in this process is governed by the fineness of yarn desired. The cotton is delivered from them to the spinning frame and is known as "roving."

The spinning frames finally convert the roving by a last doubling, drawing, and twisting process into yarn of the desired size and twist. "Mule" was the name of the old type of spinning frame which executed these tasks in several motions. It is still used for very fine yarns but composes only 10 per cent of all spindles in the United States. The "ring frame," which performs all operations simultaneously, is preferred today and is used exclusively in Texas.

To make thread and certain types of cloth, several yarns must be combined; this is done by spindles set up into what is known as "twisting frames." This is a twisting process which serves to combine two or more yarn without changing their individual size.

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Weaving combines "warp" yarns, those going lengthwise, with "filling" yarns ("woof" or "weft"), those crossing at right angles. The several kinds of fabrics are differentiated from each other largely by the system in which the filling crosses the warp. In sheetings, for instance, the filling passes alternately over and under a warp thread while in duck it passes over two of them and under the next two.

In principle, there is no difference in the process of making filling and warp yarns. Moreover, both types are wound by the spinning frame onto cardboard quills (cops). The weft yarn is ready for use in weaving in the cop form as delivered from the spinning frame. The warp yarn on the other hand must first be transferred to ordinary spools ("spooling"), a large number of which are then placed on a rack called "creel" and unwound onto a "beam." The warp, when in the loom, is subject to some strain by the shuttle. It is therefore sized or "slashed" that is, soaked with a solution of starch to prevent breaking. To accomplish this, the warp on the beam is unrolled through a warm starch bath and dried by currents of hot air. This makes a certain amount of process steam necessary in every cotton mill. The threads on the beam are lastly drawn through the harnesses; this is the only operation still done to any extent by hand.

Beams and harnesses are then installed on the loom. The cloth beam unrolls the warp beam slowly, while the harnesses lift and lower the warp threads in regular sequence. Simultaneously, the "shuttle" carrying the filling is thrown between the warp threads.

After the cloth is taken off its cloth beam, it is inspected, mended, folded, and made ready for shipment.

Processes as highly mechanized as spinning and weaving do not require great skill from the operator. In fact, with one or two exceptions the textile operator belongs in the semi-skilled class; he can be taught his job in three months, although it may take him a year to become really efficient. On the other hand, it is also obvious that the machinery must be kept carefully adjusted at all times. This is the duty of the "fixers" who are highly specialized mechanics, trained and paid as such.

The underlying principles of all the machines described are old and few important improvements have been made recently. The most important contribution of the twentieth century is the loom with automatic replacement of filling bobbins, and it has not yet been adopted in a majority of the mills. Reports in 1927 showed that in New England only 30 per cent of the looms were of this improved type. One reason for such slow development is the length of life of textile machinery. In spite of the large investment necessary, however, most successful cotton mills are equipped with the newest machinery.

Under the pressure of rising cotton prices and particularly the large discounts for low grades which have prevailed during the last

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few years, improvements of opening machinery has made remarkable progress. Today a lower grade of cotton can be so cleaned as to give the same results as were formerly given by the higher grades. Another improvement now under way is the so-called system of "long draft spinning" which would eliminate the roving frames; the results, however, are not yet conclusive.

The Distributing Organization

It is a particular trait of the cotton industry that while its managers have always closely supervised their mills and have often shown shrewd knowledge of the cotton market, they seldom have given much thought to the distribution of their product. This has been cared for either by a commission house or by brokers.

The commission house charges a fee varying from 2½ per cent up to 5 per cent, depending on the kind of goods and number of services rendered. It often guarantees the mill's accounts, advises it as to styles, and sometimes participates even in the management of the mill through representation on its board of directors. These commission houses often are very powerful organizations extending their influence to many mills. The broker is merely a clearing house for orders and charges a fee of ½ to 1 per cent.

To be useable for wearing apparel, the gray cloth produced in the mill must first be finished. Consequently the main customer of the commission house and broker is the converter, who has the cloth finished (bleached, dyed, or printed) according to his pattern by a job finisher. Sometimes the commission house itself performs this function, but the finisher rarely takes title to the goods he processes. The converter sells the finished cloth to the "cutter-up" (garment manufacturer), to the buying syndicate of a group of retailers, to large department and chain stores, or to the traditional wholesaler who in turn sells to the retailer.

On the other hand, fabrics to be used industrially do not, as a rule, require any finishing. They go in large quantities direct from commission house or broker to the industrial consumer.

The complicated channels of distribution have been a contributing cause to the difficulties of the textile industry: the manufacturers have largely remained out of touch with their ultimate market while important changes were manifesting themselves in the consumption of cotton goods.

First of all, style has acquired an importance unknown before in the trade. In the last five or six years a reaction has set in among consumers against the standardized article manufactured on a very large scale. The public is no longer satisfied with the staple product; it wants something distinctive. This has, of course, resulted in a shift in the demand for fabrics, favoring those which lend themselves

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to style effects. But it has also had the effect of changing the traditional channels of distribution; the tendency toward style has been responsible for the growing importance of the cutter-up.[1] Direct buying by department and chain stores has continued to develop as have buying syndicates. A change of clientele has thus taken place, the importance of which many mills have not been in a position to gauge.

Furthermore, the average size of the order has decreased because of style tendencies and instability of cloth prices. This has increased the manufacturer's selling expenses and forced upon him the load of carrying stock in the face of increased style risk.

Several suggestions have been offered to adjust the distribution end of the industry to the new conditions. One of these is direct selling by the mills without using intermediaries. Considering the multiplicity of outlets in the distribution of cloth, it is doubtful whether this is in all cases the proper solution. It is perhaps not so much the selling house which is at fault as the use made of it by the manufacturer. In spite of his connection with a commission house, the manufacturer cannot afford to remain indifferent toward his sales problem.

On the other hand, the advantages of direct selling may prove an added incentive to the merging of mills in order for them to be able to maintain their own national or even international selling organizations.

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[1]The Bureau of Business Research, Harvard University, in *Distribution of Cotton Goods* reported that piece goods sales in ten department stores had decreased 24 per cent from 1920 to 1925 and that in 1925 one-fourth of all converted goods were taken by cutters-up.

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PART I

THE COTTON MANUFACTURING INDUSTRY IN THE NATION

History

Cotton manufacturing was the first industrial process to which mechanical power and factory methods were applied. The mechanization began about the middle of the eighteenth century. Most of the fundamental inventions were made in England. The British Government attempted to keep a monopoly for its industry by prohibiting the export of machinery and plans. An Englishman named Samuel Slater, however, built from memory the first textile machinery in the United States in his mill in Rhode Island in 1792. The industry in the United States was established in New England shortly after its development in England. That it should have begun in New England is natural, if the circumstances of the times are considered. The cheaper products coming from the Ohio Valley tended to make farming in New England unprofitable; furthermore, New England possessed a large part of the Nation's capital and the water power then essential to the development of the factory system. Unprofitable agriculture furnished cheap labor to start the industry, but the development, especially after the Civil War, rested primarily on cheap immigrant labor and cheap capital.

Because of certain staple products which lent themselves to profitable large-scale farming, the South remained almost exclusively agricultural down to the middle of the nineteenth century. In 1850, competition from the textile industry of the Southeast began to make itself felt, and by 1855 much the same fears were expressed for New England's future as are heard today. The Civil War destroyed this first industrial development in the South and gave New England another forty years of security.

The cotton industry began to revive in the Carolinas around 1900, but until the World War, it was not threatening due to lack of capital. Today, the cotton-growing states exceed New England in number of spindles. Large production centers have sprung up in North Carolina, South Carolina, and Georgia in competition with the old ones in Massachusetts and Rhode Island.

The Causes of the Southward Shift of the Industry

Since 1926, the number of spindles in place in the United States has declined, as Exhibit I shows. According to Exhibit II, however, this decline has been under way in New England since 1923, while the South has maintained a rapid growth.

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The accumulation of capital in recent years has permitted the South to take advantage of certain circumstances which favor that section over New England. Since the close of the war period, these factors have increased in importance and the number of active spindles has been declining in New England since 1921, lately at a very rapid pace. On the other hand, the southern industry has been able to keep almost all of its spindles busy (See Exhibit II).

The reasons for the recession of activity in New England are varied, although some are not so important as others. Trade opinion in New England is still very much divided, and it is obvious that the importance of the several factors varies for individual cases. However, if the analysis of manufacturing cost given in Table I is considered, it should not be difficult to assign to each of these factors its true value. Table I applies to sheeting (5.75 yards per pound) in New England. This is a standard weave chosen because it ranges half way between coarse and fine goods.

TABLE I

ANALYSIS OF MANUFACTURING COST

5.75 Sheeting—New England, 1926, and adjusted for southern conditions

Cost Factor	—Per Cent of Total Costs— New England[2] Per Cent	South Per Cent
1. Cotton, including transportation of raw material and woven goods	45	53.0
2. Labor	34	27.3
3. Power	5	4.0
4. Supplies	2	2.4
5. Fixed Charges		
a. Average Depreciation	3.1	2.9
b. Taxes	2.0	2.0
c. All Insurance	0.6	0.6
d. Repairs and Maintenance	2.5	1.8
e. Administration and Sales	5.8	6.0
	14	13.3
Total	100	100.0

[2]Main, Charles T., and Gunby, Frank M.: "The Cotton Textile Industry," *Mechanical Engineering*, 1926, pp. 999. The authors calculate the possible savings in the South in dollars per spindle. For the purpose of this discussion, their results in dollars are translated into percentages of total cost.

In the manufacture of coarse goods such as those made in Texas today, the percentage of total cost represented by cotton will be higher, while that by labor will be lower. The opposite will be true in the manufacture of the finer goods which are typical of the New

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England industry. Also, fixed charges are higher for finer goods, because the output per spindle is less; this means that the cost of depreciation, taxes, insurance, repairs, and maintenance must be spread over a smaller number of pounds of yarn.

Presently, the several items will be analysed as to their effect on the industry in the North and in the South.

Labor.—Labor in New England is very largely composed of relatively recent immigrants. They are as yet ill-assimilated, and "class conscious." Their national origin is highly diverse, social and economic life has been different, so that understanding between employers and employees has been difficult. The more skilled operators have taken great pride in their technique and are slow to accept new labor-saving methods.

The Southeastern mills have recruited their force from the class of small, white farmers. These were generally tenants in the lowlands and were owner farmers only in the mountainous or poor soil regions. They are a homogeneous group, conscious of belonging to the same racial stock as their employers. Their living conditions have been much improved by their enrollment in industry and this change is recent enough to insure their good will. They are not burdened by industrial traditions and are willing to adopt new and more efficient methods. Finally, their spirit of individualism, coupled with the conditions mentioned above, has made them slow to respond to group action.

Figures showing the differences in wages paid in the North and in the South will be found in Exhibit III-A. The data are taken from the publications of the United States Bureau of Labor Statistics and apply to 1926. The changes since that time probably do not affect materially the comparisons noted. The wage data of the three most important cotton growing states have been averaged and compared with those of Massachusetts, in which state are located 75 per cent of the spindles of the North. The hourly rate is considered in order to obviate the difficulty of a different working period.

The median of the wage differences indicates a typical saving in the Southeastern States of 33.8 per cent. While industrialization tends to smooth out these differences in wages, it is probable that the industry in the South will always enjoy a substantial advantage over New England because living actually is cheaper in the South. Unfortunately, there are no adequate figures available on the cost of living in the textile centers of the Southeast; it is nevertheless to be noted that due to the climate, housing, heating, and clothing costs are materially lower in the Southern States.

The figures in Exhibit III-A, even if corrected for cost of living, would not afford a true comparison of wage costs; for, besides wages, the southern employer makes other outlays toward the upkeep of

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his working force. To a much larger extent than in New England, the southern mill owner must provide for housing. The usual rate is 25 cents a week a room, including water and light. Also, many companies maintain their own stores where they retail food to their employees at cost or below. For the purpose of comparing wages, these expenditures should be included and should be listed with the manufacturing expenses of the mills.

As a matter of fact, these outlays cut deeply into the advantage of southern mills as regards labor cost. Several sources of information estimate these expenses to be from $2.11 to $4.36 per operator per week. The latter figure appears, however, to include some expenditures for roads, schools, churches, etc., which, as will be explained later, should be regarded as an addition to taxes. The majority of the informants seem to agree upon an average of $3 per operator per week. This corresponds to an addition to the hourly rate in the Southeast of $0.055 and reduces the median of the "Southeastern Saving" in percentage of the Massachusetts rate from 33.8 per cent to 20 per cent.[3]

A saving in wages is of interest only if it is not offset by lower efficiency. The best opinion indicates that there is little difference between the efficiency of New England labor and that of the Piedmont district. Corroborating evidence is the fact that silk mills, which require more skillful labor than do cotton mills, are being erected in the Piedmont. A difference in efficiency has been noted, however, between the labor of the Piedmont and that of the lower sections of the Southeast.

Labor Laws.—A difference of 20 per cent in labor cost, or on the basis of Table I a saving of 6.8 per cent in total cost could alone explain the development of the Southeastern textile industry in competition with that of New England. Legal restrictions with respect to hours of labor are frequently listed as a further handicap to the industry in Massachusetts. Table II indicates the maximum number of weekly hours of work permitted for women in the several states engaged in cotton manufacturing.

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[3]This results from a recalculation of the "Southeastern Saving" columns in Exhibit III-A. The hourly adjustment of $0.055 was added to the southeastern rates and the percentage savings were recomputed. The median of these revised percentage savings is 20 per cent.

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TABLE II

MAXIMUM WEEKLY WORKING HOURS FOR WOMEN

48 Hours	49½ Hours	54 Hours	55 Hours	56 Hours	57 Hours	60 Hours	No Limit
Mass.	N.Y. (after Jan. 1, 1928)	Ark. Me. N.H. N.J. Okla. Pa. R.I. Texas[4]	Conn. S.C.	Vt.	Tenn.	Ga. Ky. La. Miss. N.C.	Ala.

[4]See Chapter II for further information.

The practice differs somewhat from the law in that many New England mills outside of Massachusetts also work 48 hours only, while in spite of the 60 hours allowed in North Carolina and Georgia, the majority of the mills in the Southeast work only 55 hours.

Of still greater importance, however, is the restriction of night work in the Northern States. Night work for women is prohibited in Connecticut, Massachusetts, and New York and is limited in New Hampshire.

To illustrate the effect of this law, the findings of a detailed investigation of a southern mill made by the author in 1925 may be quoted: A two-shift regime lowered manufacturing cost (all costs except raw material and selling expenses) by 7.5 per cent in spite of increased village expenses. Assuming manufacturing cost to be 48 per cent of the total cost as in Table I, the saving in terms of total cost would be 3.6 per cent; this would assure a small dividend when a competitor, operating under similar conditions but running one shift only, would just cover his costs. In many cases, a saving per pound of cloth should also be possible on selling expenses.

Power.—Water power is one of the historical reasons for the location of the industry in New England, but it has long since become insufficient. Most New England textile mills today have power plants, since it is only in the last few years that large, efficient steam centrals have been erected. These sources of power are slightly more expensive than the widely distributed hydro-electric power of the Piedmont (See Exhibit IV-A). New England mills find a particular incentive to generate their power because of their heating requirements. For seven or eight months of the year they need steam for that purpose and it costs them only little more to get their steam up to such pressure that it can run a turbine or engine prior to its use at low tension in the heating coils. At any rate, power constitutes only about 4 or 5 per cent of the total cost of the

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fabric. Thus, it is not so much the cost of power which matters but its availability in such form that the original investment may be kept down by avoiding the separate private power plant.

Taxes.—Unfair tax burden has often been blamed for the removal of mills from New England to the South. Due to more developed public service, Massachusetts, and to a lesser degree the other Northeastern States, require larger budgets for state as well as for county and town purposes than do the Southern States. However, there are many services provided in the North by public authorities out of tax receipts which in the South the mill owner has to supply. In his mill village, the southern manufacturer has often to build not only houses, for which this analysis already has accounted, but also roads, sewers, churches, schools, and community houses. He must, therefore, add to his taxes the interest on this investment and sometimes the upkeep, including the salary of teachers and ministers. Only with this addition will taxes become comparable. The comparison is further complicated by the differences in the system of taxation. In the North, there is a blanket tax rate levied by the city or town; in the South there are separate levies for the state and county, the town, school, etc. It has been therefore relatively easy for the Committee on Tariff and Taxation of the National Association of Cotton Manufacturers (Boston) to ascertain in 1927 an average annual tax cost in twenty-two Massachusetts towns and cities of $0.720 a spindle (high, $1.08; low, $0.419); but their figures of $0.40 to $0.50 per spindle for the Carolinas and $0.30 per spindle for Georgia and the far South are more in the nature of estimates.

It may be doubted, therefore, whether on this score the South enjoys a real advantage. True, with advancing industrialization, less and less community expenses will be necessary there; but since somebody will have to care for roads, sewers, schools, and churches, it will simply mean a corresponding increase in taxes.

It seems likely, however, that at least the assessment of industrial property has worked a hardship on the manufacturers in New England. In New Bedford, for instance, the assessed valuation is on a par with the book value while in Fall River it is 30 per cent above it.[5] Considering the very cheap prices at which many mills have recently changed hands in that section, the assessed valuation appears to be too high. On the other hand, the campaign of the National Association of Cotton Manufacturers for equalization of assessment has already borne some fruit.

Raw Material.—The fact that New England mills have to transport the cotton while the southern factory "finds it at its door" is probably the most frequently given reason for the southward shift of

[5] National Association of Cotton Manufacturers (Boston), *Report of the Tariff and Taxation Committee*, 1927.

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the industry. From Table III it appears, however, that in the manufacturing states of North Carolina, South Carolina, and Georgia, the production of cotton covers only about two-thirds of their own consumption plus their exports. Cotton exported from these states through New York and Virginia ports would lower this percentage considerably.

TABLE III

PRODUCTION, CONSUMPTION, AND EXPORTS OF RAW COTTON, NORTH CAROLINA, SOUTH CAROLINA, AND GEORGIA, 1925–1926

(In Thousands of Bales)

State	Production	Consumption	Ratio of Production to Consumption Per Cent	Exports	Ratio of Production to Consumption Plus Exports Per Cent
North Carolina	1,101	1,394	79	99	
South Carolina	808	1,078	75	230	
Georgia	1,163	1,012	115	867	
Total	3,152	3,484	90.4	1,196	67.3

Source: United States Department of Commerce.

It must be remembered also that the specialization and fine adjustment of machinery of the present day require that a mill use a definite type of raw material. The average southeastern mill probably does not buy more than one-third of its supply in its vicinity.

In the following paragraphs an attempt is made to estimate how much a mill in the industrial section of the Southeast benefits from its location in the cotton belt.

In Exhibit V-A, freight rates from many concentration points have been averaged by states for the four main manufacturing centers: Fall River, Mass.; Greensboro, N.C.; Greenville, S.C., and Columbus, Ga. The figure for Fall River applies to all of New England, as the rate is the same for all points in that territory. If the freight rates to southern manufacturing points (Exhibit V-B) are expressed as percentages of that to Fall River, it is found that the former are lower in a marked degree only for the states in the immediate vicinity of the southeastern textile region. Beyond these states, freight rates to southern manufacturing points take a decided jump, reducing New England's handicap. Greensboro, N.C., does not save more than 21 per cent of Fall River's rates on all cotton coming from states outside of North Carolina, South Carolina, Georgia, and Alabama, while 26 per cent is the maximum saving of Greenville,

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S.C.; Columbus, Ga., being located on the Alabama-Georgia border, saves no more than 34 per cent of the Fall River rate on all cotton grown outside of its neighbor states, South Carolina, Alabama, and Mississippi.

This means that, depending upon the location, on the bulk of its supply the southeastern industry does not save more than 21 per cent, 26 per cent, or 34 per cent of the freight which New England has to pay. But how much is that saving in relation to the outlay for raw material? What part of the total cost of cloth do the percentage figures represent?

For illustrative purposes, cotton may be valued at $100 a bale (20c a pound) and variations in the cost, f.o.b. mill town, calculated. These calculations are shown in Table IV for Fall River, Mass., Columbus, Ga., and Greensboro, N.C. The shipping points are "averages" for the indicated states, *i.e.*, the rates for typical points are averaged, as is explained in Exhibit IV-A. These shipping points were selected in order to show the most favorable and the least favorable rates to the southeastern textile centers from the western section of the Cotton Belt.

TABLE IV

COST OF RAW MATERIAL, F.O.B. MILL TOWN, ALL RAIL RATES

Cotton Valued at $100 a Bale

Average Shipping Point	Fall River, Mass.	Columbus, Ga.	Greensboro, N.C.	Savings of Southeastern Mill: Dollars per Bale	Savings of Southeastern Mill: Percentage of Fall River Cost
Arkansas	$106.535	$104.970	$	$1.665	1.5
Louisiana	107.525		105.950	1.575	1.5
Texas	107.855		107.210	0.645	0.6

On a large part of its raw material, therefore, the advantage of the industrial Southeast over New England runs from 0.16 per cent to 1.5 per cent of the cost of cotton at Fall River. The raw material cost in New England will hardly run more than 45 per cent of the total manufacturing cost of cloth, so that the handicap to New England mills will amount to from 0.27 per cent to 0.67 per cent of total costs. Even if a much more substantial saving is effected on cotton bought locally, it can nevertheless be concluded that the

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advantage of nearness to raw material supply is not of any real significance.

It should be noted that all rail rates only have been considered here, while in fact rail and water rates may be applied on shipments from most places to New England. The difference is small inasmuch as the railroads try to meet the water rates, but it does slightly improve the position of Fall River.

In a majority[6] of cases, the necessity of shipping the gray cloth to the finishing centers offsets the southeastern advantage of nearness to the cotton fields. New England is still in possession of 90 per cent of the finishing capacity of the country and New York is the most important cloth market. To both these points New England mills have a freight advantage (See Table V). The saving enjoyed by the southeastern mills in shipping to the Middle West is therefore not very important.

TABLE V

FREIGHT RATES ON GRAY CLOTH (1928)

(Cents per Cwt.)

To	From New England Mill	From Greenville, S.C.
New York	51	81
Chicago	106	98
St. Louis	123.5	90

Climate.—The climate has had little to do with the moving of the industry to the Southeast except indirectly, in so far as it lowers the cost of living. It is true that the industry in the past has thrived in New England because the atmosphere there contains the required amount of moisture. Today, however, moisture is provided artificially even in New England, because a greater regularity can thus be obtained.

Summary.—This discussion indicates that the Southeast owes its success to cheaper labor costs, to better understanding between employers and employees, and to less stringent industrial legislation. Proximity of raw material has had little effect. From a manufacturing point of view, all hopes for the further development of the region are justified, although the question is debatable how long the supply of labor will last in its present quality and at the present wage level.

In spite of these advantages, the Southeast has been slow to progress from coarse to fine goods. That the operator's efficiency is not

[6]For 1924, the data compiled by the Harvard University Bureau of Business Research indicated that 57 per cent of all shipments were sold to converters or converted for the manufacturer's accounts. *Distribution of Textiles*, Bulletin No. 56.

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at fault has already been indicated. The explanation rather lies in the marketing difficulties which, as explained in the introduction, increase with the finer fabrics. Nearness of the New England mills to New York, the style center, and to most of the finishing plants is of such significance that there is little incentive for the southern industry to go into fine goods as long as it does well on coarser ones.

The Present Economic Condition of the Industry

It has been seen that cotton manufacturing is one of the oldest industries and that it has grown to be vital to two important sections of the country. Over the country as a whole it ranks third in number of people employed and sixth in value of product, according to the United States Census of Manufactures of 1925. Cotton outranks by far other textile fibers, as Table VI will show.

TABLE VI

CONSUMPTION OF TEXTILES IN THE UNITED STATES, 1926

	Pounds
Cotton (raw, domestic)	3,343,500,000
Wool (raw, domestic and imported)	610,352,000
Silk (raw, imported)	66,422,000
Rayon (yarn, domestic and imported)	75,101,000

Source: *Commerce Yearbook*, 1926.

The total capitalization of firms in the cotton industry is estimated at well above $2,000,000,000. The size of the single company, however, is comparatively small. No one group of interests controls as much as 5 per cent of the spindles. In 1923, the product of 52 per cent of the companies ranged in value from $100,000 to $1,000,000. Thirty-eight per cent passed the million mark in value of product, but they represented 80 per cent of the total production.[7] Recent developments, however, indicate a tendency toward consolidations.

Nevertheless, it is to be noted that the expansion of the industry as related in the first chapter has not been followed by a corresponding prosperity. This is evidenced by Exhibit VI which shows that southern mill stocks have remained around $130 a share since the middle of 1925 in the face of the largest boom industrial values have experienced; New Bedford mill shares are on a downward trend, although they are not typical of the New England mills in general. In fact the industry is in a stage of readjustment. The New England mills have fought against adversity since 1921, and the southern mills have experienced some difficulties since the winter of 1927–1928.

[7] United States *Census of Manufactures*, 1923; no data available for 1925.

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Table VII shows that the capacity of the industry in this country (its number of spindles in place) increased over twice as fast as the population between 1910 and 1920. In spite of a decline in the number of spindles in place between 1920 to 1926, the industry's rate of increase measured from 1910 remained higher in 1926 than that of the population.

TABLE VII

UNITED STATES POPULATION AND NUMBER OF SPINDLES

Year	Inhabitants (In millions)	Period Increase Per Cent	Spindles (In millions)	Period Increase Per Cent
1910	91.9	-----	28.9	-----
1920	105.0	14.2	38.5	33.2
1926	117.0	11.4	37.5	—2.6
1910–1926	-------	27.4	------	29.8

Source: United States Bureau of the Census.

Further, it should be stated that the average spindle can turn out more goods than was previously the case because of improvements in equipment and because night work has become more general than it was before the war. But the consumption of cotton cloth expressed in yards per capita has remained substantially stationary, as Exhibit VII shows; the slight increase in the poundage consumed (average 1906–1913, 26.90 pounds; average 1920–1927, 27.25 pounds[8]) merely indicates a shift to coarser fabrics. The finer goods have suffered obviously from the abandonment of cotton fabrics in dress goods, although on the whole the figures in Table VI show that neither silk nor rayon replaces cotton to as great an extent as is commonly assumed.

The industrial uses of cotton fabric have greatly increased, the automobile industry alone consuming millions of square yards each year. However, this has not been sufficient to keep the spindles of the country in full operation because the number of spindles required to manufacture these coarse goods is much smaller than that necessary to produce a similar quantity of ginghams and similar fabrics. An adjustment in type of fabric produced is still rendered more difficult because the equipment of a mill binds it definitely to a narrow range of goods and a change from fine to coarse goods is impracticable. Exhibit VIII shows that the development of the textile industry has not been due to the export trade. The percentage of the total production exported has remained in the neighborhood of 6 per cent to 7 per cent annually for the census years since 1904.

On the other hand, imports cannot be blamed for an over-supply of cloth (See Exhibit VIII). It is true that during 1921 and 1923

[8]Based upon figures of the United States Bureau of the Census.

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the import trade increased heavily; but the volume of imported cotton goods is so small compared with the domestic production that it does not constitute a serious factor except for very fine special goods. The cotton textile industry is well protected by the tariff and goods which come in are very special fancy goods.

A summary view of the development of the industry is given in Exhibit IX. Previous to 1923 cotton manufacturing fared better than industry as a whole, being on a relatively higher level of activity and varying less under the influence of the business cycle; since then, cotton consumption has been on a lower level than general industrial activity, except for a temporary rise in 1927.

One serious problem in the industry grows out of the increase in night work, making possible great elasticity of production. Over half the mills in the country can legally work at night, yet since 1921 the industry as a whole has never operated at a yearly average of more than 103 per cent of its single shift capacity. The cotton-growing states themselves have not exceeded 120 per cent (See Exhibit X-B). Exhibit X-A further illustrates the wide fluctuations in the activity of the industry. The result of such elasticity is cut-throat competition, since manufacturers are often willing to lower prices in the hope of reducing overhead through night work.

Poor management, too, has probably had an important influence here. Manufacturers with inaccurate knowledge of their costs have taken orders at prices below cost; they hoped by increasing their output to reduce expenses, while in fact every pound of cloth they produced weakened their position and in addition kept business from mills calculating on a sound basis. Thus, cloth has passed from a seller's to a buyer's market.

Exhibit XI gives a final illustration of the weakness of the prevailing cloth prices. Here the weaver's margin (cloth price less price for cotton) is compared with the piece rate paid to Fall River weavers, the variations of which may be taken as typical of wage fluctuations. Both curves are given as percentages of the average for 1913. Labor cost will take up about 62 per cent of the weaver's margin. The weaver's margin has fluctuated since 1922 around 175 per cent of the 1913 level, while typical Fall River wages in the same period have varied between 208 per cent and 235 per cent of 1913 wages. In addition, the emphasis on the style element which has characterized the textile trade in the last few years has naturally resulted in higher selling expenses. The same may be said of the practice of buyers of ordering in smaller quantities. It is obvious that under such conditions profit margins must be decidedly reduced.

The industry has recently begun to react against the stagnation into which it has fallen. Efforts are being made to improve the machinery. Labor saving devices, job analysis, and systematic control are beginning to be adopted as they have been already in other

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industries. The Cotton Textile Institute now collects production and sales statistics to allow a safer view of the market situation, and the distribution system is being studied.

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PART II

COTTON MANUFACTURING IN TEXAS

The Development of the Industry

The cotton manufacturing industry in Texas is of relatively recent date. In its development, it should not be considered as a mere branch of the Southeast. It bears, of course, certain resemblances to the industry in the Southeast, but it is primarily a part of the general industrialization of the Southwest. It is important to bear this in mind because it is at the root of most advantages of the State over the South Atlantic region.

The development of Texas cotton manufacturing can be divided into three phases (See Exhibit XII-A). From 1895 to 1907, the number of spindles increased from practically nothing to about 110,000. The thirteen original mills in Belton, Bonham, Brenham, Corsicana, Cuero, Dallas, Denison, Gonzales, Hillsboro, Itasca, Sherman, Waxahachie, and West were built in this period. These were local undertakings and had to overcome the usual initial obstacles. From 1907 to 1920, the industry continued to grow but at a slower rate; the number of spindles in place in 1920 amounted to 143,000. The growth in this period is all the more remarkable when it is realized that it occurred simultaneously with an enormous westward extension of agriculture onto new land and with the greatest expansion in the oil industry.

By 1920, the economic foundation for industrial development was established. Agriculture was developed to a point where it seemed necessary to call on other sources of income if the pace of progress was to be maintained. In the early years of the industry, the pioneers in manufacturing had found opposition, but by the close of the World War a popular demand for mills had replaced that attitude. The cotton textile industry benefited largely from this change of attitude. The number of spindles practically doubled from 1920 to 1927. Other industries have shared in this growth so that over-specialization has been avoided. Among these may be mentioned oil and sulphur refining, the manufacture of cement and clay products, and many smaller local industries, such as the manufacture of clothing, which came as a result of the rapid growth of the larger cities.

The Present Status of the Industry

At the present time, there are in Texas twenty-four active cotton mills with an aggregate of 246,000 spindles representing a capital of

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close to $17,000,000 (See Exhibit XIII).[9] With two or three exceptions, they are all backed by Texas capital, which is represented entirely by common stock. The median capitalization is $45.30 per spindle. Naturally, some of the older mills are capitalized at a lower figure than the newer ones. Variation in the type of product is another cause of differences in value of the equipment. The size of the individual mills may seem small to an outside observer; but it must be remembered that, since most of the mills spin coarse yarn, their output in pounds per spindle is large. In spite of the small size, therefore, overhead can be distributed over a relatively large production. Exhibit XIV shows the location of the cotton mills in the State. It will be noted that there are no large textile centers but that rather a healthy dispersion exists. Dallas is the only city in which two mills are located. For historical and economic reasons, the establishments have largely located in the fertile black land belt. Those in El Paso and San Antonio employ Mexican labor.

The products manufactured in the various mills are listed in Exhibit XII. This information is summarized in Table VIII in which the relative importance of the fabrics is approximately measured by the number of spindles producing them.

TABLE VIII

TYPES OF COTTON FABRICS PRODUCED IN TEXAS

Type	Percentage of Total Number of Spindles
Ducks and Osnaburgs	44.1
Sheetings	11.2
Tire fabrics	10.3
Drills	10.1
Colored goods	6.5
Denims	6.1
Yarns	4.8
Ginghams	4.1
Blankets	2.8
	100.0

Of course, such proportions vary from year to year according to the demand for various types of fabrics. It appears, however, that ducks and osnaburgs are already well represented in the State and that new mills could more profitably produce other fabrics. A majority of the mills do not spin yarn exceeding number 16. This is explained by the necessity of starting the industry on the simpler,

[9]Two mills closed for an indefinite time and some twine mills are excluded here. Although the equipment of twine mills resembles that of a spinning mill, their problems are so different that they constitute a class by themselves.

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coarser goods. This stage, however, has been passed and there is all likelihood that finer goods mills can succeed.

It is interesting to note that in spite of this specialization the Texas cotton industry is affected by the same factors which influence spinning in the South in general. This will be seen from an examination of Exhibit XII-B in which spindle activity in Texas is compared with that of all cotton-growing states.

The major part of the Texas output goes unbleached to the market. Its use is largely industrial. Some of the typical uses of Texas-made cloth follow:

Osnaburgs:	Bagging, cretonne, artificial leather.
Duck:	Awnings, bags, bakelite, brake lining, curtains, wall papering ("tobacco cloth"), shoes, tents, tires.
Drills:	Automobile covering, in rubberizing trade.
Denims:	Manufacture of overalls and other work garments.

A small percentage of the product, possibly about 10 per cent, is branded. For such goods, direct selling is prevalent. For staple fabrics, it may be said that about 60 per cent goes through commission houses, while about 30 per cent is sold through brokers and personal representatives.

The geographical distribution of the goods is somewhat difficult to gauge because in selling through commission houses the mills lose control of their sales to a certain extent. Those mills connected with large selling houses have a national distribution. The same is true of the few establishments which are branches of large eastern or southeastern companies. After some investigation and personal inquiries, it is believed that the following figures give an approximate picture:

TABLE IX

APPROXIMATE GEOGRAPHICAL DISTRIBUTION OF TEXAS GOODS

Market	Percentage of Total
Texas and the Southwest	30
Middle West	45
Eastern States	20
Export	5
	100

The Middle West is the predominant market because of the industrial demand for fabric. In the East, New Jersey points are important for finishing and New York is the center of the textile

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market for dress goods. The distribution in Texas and the Southwest is accounted for by domestic consumption. An undeterminable but fairly important quantity goes to the West Coast.

The Manufacturing Conditions in Texas

Markets.—Texas is entering an era of industrial expansion. Such a condition not only makes a friendly atmosphere for the new manufacturer, but it also gives him the promise of a constantly growing home market. This consideration assumes greater importance when the distances from other producing centers are taken into account. Texas today has an estimated population of 5,400,000, and the rate of growth in the last decennial census period was almost 20 per cent. The industrialization of the State can be expected not only to accelerate this growth but also to increase the wealth of the inhabitants. The urbanization of Texas has been going on at a rapid pace, as appears from Table X. Industrial growth will also give impetus to

TABLE X

URBAN POPULATION IN TEXAS

Year	Number	Percentage of Total Population
1910	938,105	24.1
1920	1,512,189	32.4

Source: *United States Census*, 1920.

this tendency, the importance of which lies in the fact that a city population offers a better market than that of the country.

Dallas is nationally recognized as an important distributing center. Of special textile interest is the fact that in the last few years a clothing industry has developed there which already employs some 2,500 people. San Antonio is another such center. In 1926, information from three cotton cloth selling houses in Dallas disclosed that they sold annually 12,000,000 yards of dyed cloth alone, their activities including Texas, Arkansas, and Louisiana. To this consumption, Texas industry was contributing only from 35 to 40 per cent. Even though the activities of a cotton mill are closely dependent upon the national market, it is important that there be an active local market as well.

It is true that one of the handicaps of the Texas industry has been the lack of finishing plants nearby, but at the present time plans are being laid for the erection of such a plant within the State.

Labor.—Besides the problem of marketing its goods, the most important question confronting a cotton mill is that of its labor supply. Comparative studies have indicated that Texas is very fortunate

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in that respect. Its labor supply consists of Anglo-Saxon stock with a slight admixture of well-assimilated foreign immigration. The original qualities of these groups have been developed still further by the frontier life. Due to the short history of Texas industry, the best elements of the laboring population are still available.

The basic racial strain of the Texas population is the same as that of the Southeastern States, as most of the Texas settlers came from that region. This stock is mixed with an addition of Mid-Westerners on their second migration and with some foreign elements (See Table XI). But it must immediately be pointed out that this foreign ele-

TABLE XI

POPULATION OF TEXAS BY RACE AND NATIONALITY, 1920

Classification	Number	Per Cent of Total	Per Cent of Whites	Per Cent of Foreign Born
TOTAL	4,663,228	100.0		
Colored	745,063	15.9		
White	3,918,165	84.1	100.0	
Native Stock	3,112,262	66.7	79.4	
Foreign Stock*	805,903	17.4	20.6	100.0
Mexicans	398,174	8.6	10.2	49.2
Germans	159,219	3.4	4.1	19.8
Austrians†	64,078	1.4	1.6	8.0
All Others	184,432	4.0	4.7	23.0

Source: *United States Census*, 1920.

*This includes the native born of foreign parents as well as foreign born.
†Largely Czechs.

ment has little in common with the immigrants to the Northeast. The earliest foreign immigration to Texas consisted of the German wave of the 1840's and the 1850's. These people came here for political as well as for economic reasons, and the subsequent German arrivals have come under their influence. They still center around the first settlements, New Braunfels and Fredericksburg, with an important group in San Antonio. The Czech is the next most important group of settlers of European origin. They have settled toward Temple, to the north, and to the east of the Germans. These elements are so well assimilated that the Texan of the Anglo-Saxon stock no longer thinks of Germans and Czechs as foreigners.

There were in 1920 practically 400,000 persons of Mexican birth or parentage in Texas. Exhibit XV shows the distribution of foreign born Mexicans by counties. They center around San Antonio, El Paso, Laredo, and in the lower Rio Grande Valley. Their total was 250,000 in 1920. But in addition there were in Texas 150,000 individuals of Mexican parentage who were born in the United States. Although information as to their distribution is not available, it is

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doubtless very similar to that shown in Exhibit XV. Their industrial experience in El Paso and San Antonio has proved successful. They are willing, steady workers.

Some cotton mill labor was imported from the Southeast many years ago so that out of sixteen mills visited one had 10 per cent and a group of three mills 20 per cent of their force originating east of the Mississippi. The opinion of mill managers as to the value of such imported labor is well divided. Three other mills use Mexican labor. The number of foremen from out of the State is naturally larger; in thirteen mills for which current data are available, the foremen are distributed with respect to geographic origin as follows: Texas, 73 per cent; Southeastern States, 23 per cent; and Northeastern States, 4 per cent. At the present time, it is believed that new mills could recruit a good percentage of such minor executives in the State. Even among sixteen superintendents, twelve were found to be Texans, three came from the Southeast, and one from the Northeast, although most of them had been at one time or another in the Southeast.

The cotton mill managers report uniformly that the efficiency of Texas labor is high, and it must be remembered that some of these managers have also had experience in New England and in the Southeast. One executive who comes from Massachusetts declared at the time of the interview that he was 25 per cent ahead of the training program which he had set for the development of his force.

There are no labor organizations in the Texas cotton manufacturing industry. The workmen's agglomerations are too recent, too small, and too far apart to encourage organization. In considering the possible future development of the labor problem in comparison with that of other sections, the racial, social, and political background of the Texas worker as set forth above must be borne in mind. The characteristics of the individuals will likely be reflected in their group activities.

In summary it can be stated that Texas labor is well suited to industrial work at the present time. The population is mostly rural, but with the introduction of mechanical methods on the farm, agriculture is requiring less labor. Many are living in half-idleness and would welcome an opportunity for continuous employment. Exhibit XVI shows the density of population by counties.

Information concerning the average wages paid by Texas mills is given in Exhibits III-A and III-B. The figures represent the average of twenty of the twenty-four mills. For comparison purposes, the figures reported in 1926 by the United States Bureau of Labor Statistics are listed. These are the latest data available.

The manufacturer will find that in the South he has to bear certain charges for the maintenance of his labor force which are not

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customary in New England. On page 15 the expenses for maintenance of the labor force beyond wages have been set at $3 per worker per week in the Southeast. How much is spent in Texas cannot be stated definitely. A mill village will likely be necessary in any case to a larger or smaller extent. Of thirteen mills recently visited, nine housed all of their employees; one, 70 per cent; two, 50 per cent; and one, 40 per cent. Some degree of company housing will apply to the mills located in larger places as well as in the smaller towns. Of course, there are cities large enough to provide adequate housing facilities for the labor force of a new mill. However, it is believed in the industry that the village pays; it permits location of the mill outside of the city limits and a consequent saving in taxes. Also, the mill village usually reduces labor turnover, which means higher efficiency. In the Southeast, many companies have not only had to build houses, but also roads, sewerage plants, recreational facilities, schools, churches, etc., and to pay for their maintenance and to provide for the necessary personnel. This will not be necessary in Texas. There are many smaller towns which will take care of these matters, leaving to the manufacturer the provision of housing only. His contribution will thereby be greatly reduced.

Labor Laws.—Night work is permitted in Texas for women as well as for men but it is not general. Of sixteen mills recently visited, only seven were working two shifts. The Texas law provides a 54-hour week for women workers but allows 60 hours in the textile industry with double pay beyond 54 hours. The 55-hour week, however, is in force in all the mills, putting Texas on the same basis as the Piedmont district. The legal age for employment of children in Texas is 15 years.

Raw Material.—A majority of the counties of Texas produce cotton. It is possible, therefore, to find the raw materials at the mill's gate, and thus save the entire freight-in bill with the exception of a small trucking expense. That this advantage will hold for a long time to come is indicated by the following table:

TABLE XII

TEXAS COTTON PRODUCTION AND CONSUMPTION, 1924–1927

Year	Production in Bales	Consumption in Bales
1926–1927	5,447,788	118,071
1925–1926	4,098,249	93,494
1924–1925	4,850,956	79,627

Source: United States Bureau of the Census.

Of the fifteen mill executives questioned as to the source of their raw materials, ten declared that, barring unusual circumstances, they

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bought their cotton locally. Only one reported having to go out of the State for his supply due to his highly specialized product.

Exhibit XVII shows the distribution of cotton production in Texas. It will be noted that the eastern concentration (the black waxy lands) coincides with the area of greatest population density. The western concentration illustrates the recent expansion of the cotton belt. The figures may be taken as typical since they are averages of the three-year period from 1924 to 1926.

Power.—The industrial Southeast owes a large part of its development to the efforts of its power companies. Texas is not as richly provided with water power as the Southeast, but this power is not the only cheap source of energy in Texas; indeed, the State commands a supply of crude oil, natural gas, surface lignite, in addition to a certain amount of water power. Thus power companies here are enabled to furnish current at rates comparing favorably with those of other sections (See Exhibit IV-A). The present distribution of power lines and stations in Texas is shown in Exhibit IV-B, but it should be emphasized that there are now large developments going on. There is a large choice of locations where reliable power is available. Of the seventeen mills visited, fifteen bought their power.

Taxes.—The system of taxation in the State of Texas rests entirely upon property and occupation taxes. It is highly decentralized; wide autonomy is left by the constitution to the counties and the cities, the tax rates of which are limited only by a maximum. The percentage of real value assessed also is in the hands of counties and cities respectively. Furthermore, they can, by act of Legisature, create a part or the whole of their territory as an independent district for a particular purpose (school, road, irrigation, levees, etc.). Such a district can also, providing it has its own assessor, value property independently. It is therefore hardly possible to show a complete picture, but in Table XIII the constitutional limits are given.

TABLE XIII

TEXAS PROPERTY TAX RATES

Maxima Imposed by the State Constitution

Political Unit	Rate per $100 of Assessed Valuation
State	$0.77
County	0.95
City, below 5,000 inhabitants	1.50
City, above 5,000 inhabitants	2.50
School district	1.00

Bonds for roads, water control, navigation districts, etc. are limited to 25 per cent of the property assessed.

Sources: Constitution of Texas, Art. 3, Sec. 52; Art. 8, Sec. 9; Art. 11, Secs. 4 and 5; Art. 16, Sec. 59; Revised Civil Statutes Arts. 1026, 1028, 1038, 7048.

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Not every town belongs to an independent district; some pay all expenses out of their own tax income. Nor is it at all common for any county or town to reach its maximum; the State itself levied in 1927–1928 only 67c per $100 of the assessed valuation.

While complete information as to the percentage of true valuation assessed in the various counties is not available, it may be said that for the State and county it averages about 40 per cent, for the city about 60 per cent, and for school districts about 66 per cent. In principle, land, buildings, and equipment are valued upon the same basis; in fact, however, there are differences. No exemption from State and county taxes is available. In some few places, exemptions from or reductions of city taxes are granted, but there appears to be no constitutional sanction covering such procedure.

Companies operating in Texas are further liable to a franchise tax based upon their capital, or, if they are corporations foreign to Texas, upon such proportion of their capital as corresponds to their Texas gross receipts. The rates are as follows:

TABLE XIV

FRANCHISE TAX

	Rate per $1,000
Texas corporations:	
Authorized capital or paid-in capital plus undivided surplus whichever is larger	
First $1,000,000	$0.50
Beyond $1,000,000	0.25
Foreign corporations:	
For such part of the total capital as corresponds to the proportion of gross receipts from Texas activities to total gross receipts:	
First $100,000	1.00
Next $900,000	0.50
Beyond $1,000,000	0.25

Freight Rates.—The relative isolation of Texas from the leading markets of the country has often been cited as a handicap to Texas industry. The maps in Exhibit XVIII are designed to show the limits of the region in which the Texas common point territory comprising all of East and Central Texas has an advantage in freight rates over centers manufacturing similar cotton goods. Greenville, S.C., is taken as one representative of these competing textile centers. It will be seen from Map A, Exhibit XVIII that the Texas common point territory maintains its advantage to the Indiana-Ohio line, while to Boston and New York the differential in favor of the Southeast is 34.5c per 100 pounds, *i.e.*, for a pound of cloth at 45c, only three-fourths of 1 per cent of its value is made up of freight.

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Columbus, Ga. (See Map B, Exhibit XVIII) extends its territory west, but its advantage in New York and Philadelphia is reduced to 11.5c per 100 pounds; it has an advantage of only 0.5c in Chicago, 4.5c in Minneapolis, 5.5c in Memphis and New Orleans, and 8.5c in St. Louis. While these rate differences are of little importance, the entire territory west of the Mississippi favors Texas points against both Greenville and Columbus. The comparative freight rate to the Pacific Coast shows a large margin in favor of the Texas common point territory.

The recent decisions of the Interstate Commerce Commission have been largely favorable to southwestern industry and it can confidently be expected that the industrialization of the section will further this trend by increasing the volume of traffic. The rates cited will be in effect until December 10, 1928, at least. According to a recent order, the carriers are to confer with the manufacturers for the change of some of the classifications on that date.

Climate.—The main climatic factor of interest to a cotton mill is humidity. No Texas mill has complained because of inadequacy of it. All use humidifiers. Of late, these have been so developed as to regulate not only moisture but also temperature.

CONCLUSION

The main features of the cotton manufacturing industry as brought out in this bulletin are as follows: The industry is highly competitive and in many of its branches overdeveloped; but a large part of the spindles of the country are still located in a section of the country where manufacturing costs are higher than in Texas. There is therefore the possibility for further expansion in this State. It will be necessary, however, to determine carefully the kind of fabric to be produced. The advice of a selling house might be sought as these organizations of national scope are in a better position to gauge the market possibilities; such advice will be especially valuable in case the production is intended mainly for dress goods.

The kind of fabric to be made will determine the equipment. The choice and layout of machinery, however, requires skill, as it is essential that operating costs be kept at a minimum. Due to the long life of textile machinery it is possible to acquire used equipment. But it demands a competent observer to discern well-maintained from poor machinery; make and date of manufacture mean very little. Opening machinery should be bought new because very recent and important developments have taken place in this line. For the other processes, it may be necessary to buy the machines at different places. If coarse goods are considered, there will hardly be any complete equipment available in New England

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The product will also determine the size of the plant. In order to have a well-balanced plant—one which takes good advantage of all machinery, it cannot be smaller than a certain minimum which is governed by a primary machine which feeds several intermediates and by one intermediate which feeds many spinning frames. A larger mill can more easily shift from one product to another. The larger plant tends to lower overhead costs per pound of yarn produced and makes it possible to employ superior management.

The mill should not be planned below 15,000 spindles for an average count of 22's nor below 20,000 spindles for an average of 28's. Of course, a beginning could be made with only part of the equipment in place.

After the mill is erected it is necessary to employ the best possible management. Texas labor is little accustomed to industrial discipline and the training of the first crew will be all the more important. The cotton industry does not require scientifically educated managers, but it does call for a great amount of practical knowledge of all possible short cuts and for that sympathy with the workers which alone makes it possible to get the maximum efficiency out of an organization. Technical ability is at the same time a commercial advantage, as a selling house will favor the mill man who is known for reliably good ware. But beyond that, special business ability is required. The organization of the trade is so complicated that it takes a competent man to be familiar with all its turns. Texas is remote from the large centers which determine style trends and it will require more than ordinary ability to keep in touch with them.

The strong competition prevailing in the industry has an effect also on the financing of a new mill. Such an undertaking cannot afford to bear large promotion fees. The industry can bring good, steady returns, but they do not compare with those customary in certain extracting industries. Stock in a cotton mill must be considered as an ordinary industrial investment and its safety will depend upon the competence of the management.

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EXHIBITS

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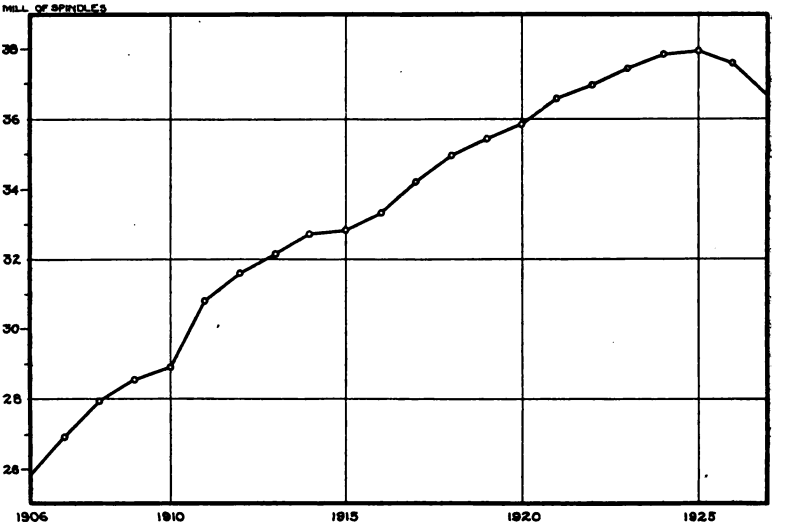
EXHIBIT I

COTTON SPINDLES IN PLACE IN THE UNITED STATES

July 1 of Each Year, 1906–1927



Year	Number of Spindles
1906	25,811,681
1907	26,939,415
1908	27,964,387
1909	28,573,435
1910	28,929,093
1911	30,803,662
1912	31,582,679
1913	32,149,617
1914	32,744,012
1915	32,840,730
1916	33,333,176
1917	34,221,252
1918	34,940,830
1919	35,443,156
1920	35,834,463
1921	36,617,584
1922	36,945,554
1923	37,408,689
1924	37,804,848
1925	37,928,792
1926	37,586,166
1927	36,695,516

Source: United States Bureau of the Census.

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EXHIBIT II

COTTON SPINDLES BY SECTIONS

In Thousands of Spindles

Year	Cotton-Growing States		New England	
	In Place	Active	In Place	Active
1906	9,135	8,995	14,408	14,408
1907	9,850	9,528	15,164	14,913
1908	10,394	10,200	15,681	15,329
1909	10,679	10,429	15,766	15,592
1910	10,754	10,494	15,981	15,735
1911	11,574	11,085	17,045	16,511
1912	11,879	11,583	17,570	17,140
1913	12,413	12,227	17,610	17,311
1914	12,923	12,711	17,683	17,408
1915	13,186	12,956	17,526	17,101
1916	13,494	13,382	17,788	17,474
1917	14,159	14,156	18,002	17,761
1918	14,530	14,529	18,267	17,985
1919	14,994	14,846	18,393	18,065
1920	15,231	15,231	18,543	18,287
1921	15,710	15,707	18,734	18,388
1922	16,075	15,906	18,856	17,939
1923	16,458	16,310	18,930	18,054
1924	17,226	16,944	18,576	17,066
1925	17,635	17,292	18,333	15,975
1926	17,875	17,574	17,946	15,526
1927	18,169	17,894	16,871	14,995

Sources: Active Spindles, United States Bureau of the Census; Spindles in Place, United States Bureau of the Census quoted by National Association of Cotton Manufacturers *Yearbook.*

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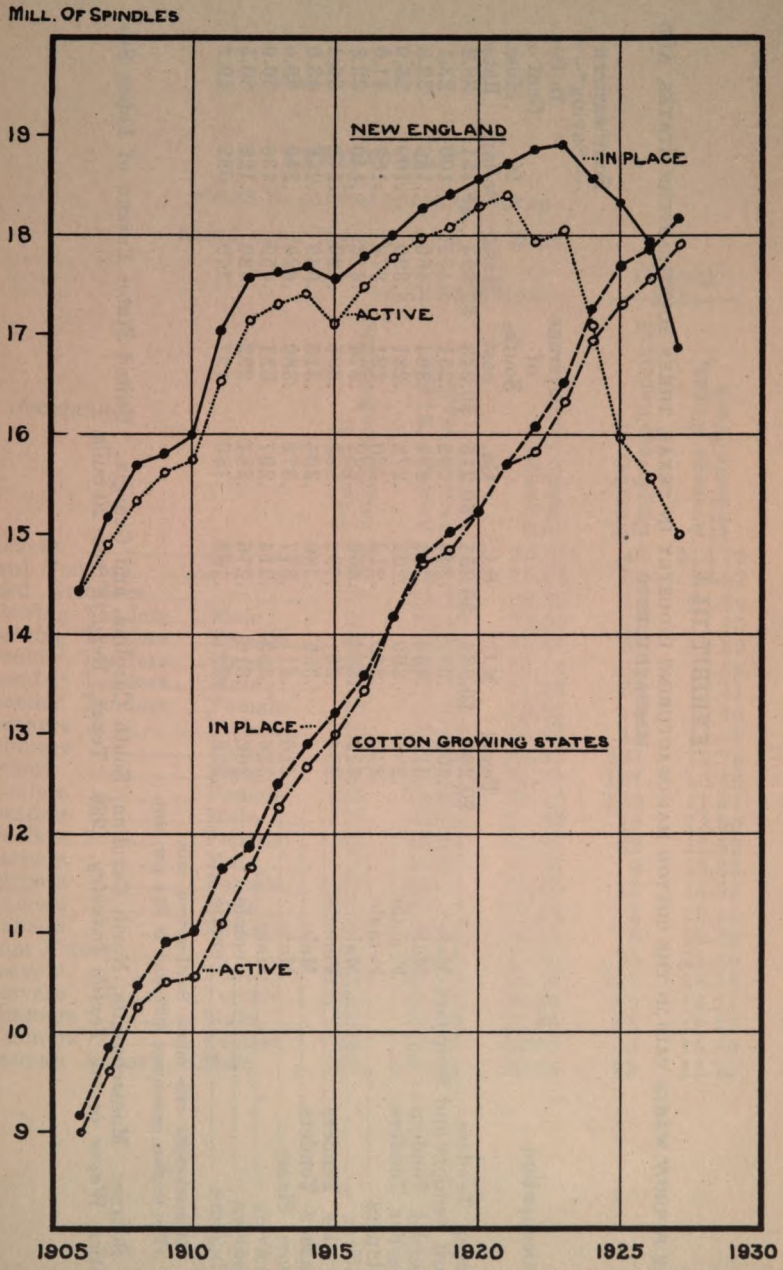

EXHIBIT II—Cotton Spindles by Sections

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EXHIBIT III-A

THE HOURLY WAGES PAID IN THE COTTON MANUFACTURING INDUSTRY IN TEXAS, THREE SOUTHEASTERN STATES, AND MASSACHUSETTS

Occupation		Texas	N.C.	S.C.	Ga.	Average of Southeast	Mass.	Southeastern Saving*: In Dollars	Southeastern Saving*: In Per Cent of Mass. Rate†
Picker Tenders		$0.266	$0.264	$0.251	$0.215	$0.243	$0.394	$0.151	38.2
Card Tenders and Strippers	Male	.256	.277	.244	.232	.251	.431	.100	23.1
Speeder Tenders	Male	.312	.333	.294	.291	.304	.460	.156	33.8
Speeder Tenders	Female	.294	.300	.267	.278	.281	.390	.109	28.0
Spinners	Female	.245	.230	.213	.220	.221	.378	.157	41.6
Doffers	Male	.312	.282	.260	.282	.274	.414	.140	33.8
Spooler Tenders	Female	.234	.231	.192	.193	.205	.323	.118	36.4
Slasher Tenders	Male	.....	.355	.280	.306	.313	.549	.236	43.0
Loom Fixers	Male	.416	.411	.377	.372	.380	.620	.240	38.6
Weavers	Male	.326	.353	.314	.297	.321	.459	.138	30.0
Weavers	Female	.362	.316	.276	.284	.292	.420	.128	30.5
Trimmers	Female	.238	.227	.183	.183	.197	.279	.082	29.4

*Massachusetts rate minus Southeastern rate.

†The median percentage difference is 33.8 per cent.

Source: Massachusetts, North Carolina, South Carolina, and Georgia: United States Bureau of Labor Statistics, *Wages in the Textile Industry*, 1926. Texas: Reports from 20 mills.

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EXHIBIT III-B

WAGES IN COTTON MILLS OF TEXAS

Based upon Reports from 20 Mills

Occupation		All 20 Mills — Number of Employees Reported	All 20 Mills — Average Wages, 55-hour Week	All 20 Mills — Average Hourly Rate	11 Duck Mills — Number of Employees Reported	11 Duck Mills — Average Wages, 55-hour Week
Pickers		90	$14.62	26.60c	46	$13.70
Card Tenders		106	14.13	25.68	51	13.87
Card Grinders		32	21.12	38.38	15	21.50
Drawing Tenders	Male	27	12.10	22.00	16	11.25
Drawing Tenders	Female	64	14.20	25.80	31	12.50
Slubber Tenders	Male	68	18.25	33.18	34	18.68
Speeder Tenders	Male	119	17.40	31.25	56	17.41
Speeder Tenders	Female	39	16.09	29.22	14	16.43
Spinners	Male	19	12.48	22.66	11	11.59
Spinners	Female	423	13.50	24.55	191	12.76
Doffers	Male	208	17.17	31.20	101	16.46
Spoolers	Female	285	12.89	23.42	138	11.81
Creelers	Male	19	14.60	26.53	10	13.50
Creelers	Female	53	13.56	24.62	32	12.50
Warpers	Male	8	17.50	31.40	3	15.83
Warpers	Female	37	15.72	28.60	15	14.83
Beamers	Male	22	18.40	33.42	5	15.50
Beamers	Female	19	19.33	35.15	6	13.33
Loom Fixers		130	22.90	41.60	38	21.30
Weavers	Male	344	20.75	32.65	112	18.26
Weavers	Female	239	19.91	36.20	79	16.61
Trimmers	Male	52	14.90	27.05	28	13.57
Trimmers	Female	46	13.13	23.85	6	10.00
Common Labor	Male	223	14.41	26.62	85	12.15

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EXHIBIT IV-A

POWER COST

The cost per kilowatt-hour in important cotton manufacturing centers has been based for New England and the Southeastern States upon the cheapest applicable rates published in the National Electric Light Association Rate Book (1927) and for Texas upon reports from power companies serving cotton mills. They apply to the following conditions:

Capacity of Mill: 15,000 spindles.
Total Connected Load: 1,000 h.p.=740 kw.
Demand: 670 kw.
Operating Time based upon Average Month of 25.6 Days:
New England: 206 hours a month (48 hours a week; 1 shift).
Southeast and Texas: 235 hours a month (55 hours a week; 1 shift); 470 hours a month (110 hours a week; 2 shifts).
Power Consumption:
New England: 138,200 kw-hr. (48-hour week).
Southeast and Texas: 157,000 kw-hr. (55-hour week).
314,000 kw-hr. (110-hour week).

Average Cost per kw-hr.

New England (48-hour week)		1.	1.84c
		2.	1.645c[1]
		3.	1.49c
		55-hr. Week	110-hr. Week
Southeast	1 and 2.	1.422c	1.355c
	3.	1.37c	1.08c
	4.	1.25c	0.927c[2]
Texas	1.	1.69c	1.20c
	2.	1.59c	1.20c[3]
	3 and 4.	1.5c	1.25c[4]

[1]For Pocahontas coal between $4.25 and $5.25 a long ton, f.o.b. power house, above or below adjustment according to actual cost.

[2]Transforming equipment furnished by customer.

[3]Power factor=80%; for each 5% above, ¾% credited; for each 5% below, 1½% penalized.

[4]For cost of 1,000,000 B.t.u. between 9 and 15c; for each cent above or below, credit or charge respectively of 0.025c per kw-hr.

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INTS

us, Ga.

	Per Cent
-------	85
-------	83
-------	83
-------	76
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-------	69
-------	66
-----	60
lina..	60
-------	52
-------	45

EXHIBIT V-A

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New England

Southeast

Texas

AVERAGE FREIGHT RATES FROM COTTON-GROWING STATES TO COTTON-MANUFACTURING CENTERS

In Dollars

From: State	Number of Shipping Points in Average	To Fall River Mass.	Greensboro N.C.	Greenville S.C.	Columbus Ga.	Difference between Rate to Fall River and Rates to Greensboro N.C.	Greenville S.C.	Columbus Ga.
Alabama	11	1.204	0.822	0.765	0.541	0.382	0.439	0.662
Arkansas	13	1.307	1.111	1.064	0.994	0.196	0.243	0.313
Georgia	11	1.07	0.73	0.672	0.555	0.34	0.402	0.515
Louisiana	8	1.505	1.19	1.143	1.000	0.311	0.362	0.505
Mississippi	12	1.29	1.037	0.977	0.780	0.252	0.383	0.510
Missouri	1	1.205	1.065	1.005	1.035	0.140	0.200	0.170
North Carolina	13	1.09	0.521	0.679	0.782	0.569	0.411	0.308
Oklahoma	10	1.532	1.39	1.355	1.27	0.140	0.177	0.262
South Carolina	11	1.160	0.634	0.530	0.70	0.526	0.637	0.46
Tennessee	4	1.120	0.952	0.892	0.823	0.248	0.308	0.379
Texas	20	1.571	1.442	1.383	1.303	0.129	0.188	0.268

Rates are the same for all New England points.
Source: Bureau of Railway Economics, Bulletin No. 23, October, 1927.

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EXHIBIT V-B

FREIGHT RATES TO SOUTHERN MANUFACTURING POINTS IN PERCENTAGE OF RATES TO FALL RIVER, MASS.

(Based upon Exhibit V-A)

To Greensboro, N.C.	
From:	Per Cent
Texas	92
Oklahoma	91
Missouri	87
Arkansas	84
Mississippi	80
Louisiana	79
Tennessee	79
Georgia	68
Alabama	68
South Carolina	55
North Carolina	48

To Greenville, S.C.	
From:	Per Cent
Texas	88
Oklahoma	88
Missouri	83
Arkansas	81
Mississippi	76
Louisiana	76
Tennessee	74
Georgia	63
Alabama	63
North Carolina	62
South Carolina	46

To Columbus, Ga.	
From:	Per Cent
Missouri	85
Oklahoma	83
Texas	83
Arkansas	76
North Carolina	72
Tennessee	69
Louisiana	66
Mississippi	60
South Carolina	60
Georgia	52
Alabama	45

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EXHIBIT VI

VALUE OF SHARES

Unit: Dollars per Share

Fairchild's New Bedford Mill Share Average

Month	1923	1924	1925	1926	1927	1928
Jan.	162.55	147.05	142.42	120.10	84.25	76.73
Feb.	161.88	146.10	138.24	117.56	81.32	74.32
March	164.12	144.22	135.82	112.60	84.72	73.71
April	166.35	142.76	126.63	104.79	85.89	73.06
May	163.84	130.25	120.97	97.48	88.33	69.81
June	162.04	133.23	117.77	93.36	89.59	.....
July	159.77	133.59	115.91	91.55	87.26	.....
Aug.	155.97	135.93	116.20	87.09	86.21	.....
Sept.	153.90	138.30	119.28	89.44	85.26	.....
Oct.	153.82	139.42	123.57	89.20	83.43	.....
Nov.	152.30	140.26	125.95	84.98	79.39	.....
Dec.	149.54	141.42	123.23	81.68	77.68	.....

Source: Fairchild's Publications.

Fairchild's Southern Mill Share Average.

Month	1922	1923	1924	1925	1926	1927	1928
Jan.	100.11	137.28	155.51	140.42	135.52	126.17	132.40
Feb.	100.08	145.31	153.79	138.35	136.67	125.84	132.05
March	99.86	155.64	149.82	137.86	135.46	127.11	131.90
April	100.76	159.16	145.09	136.28	134.39	127.93	131.83
May	102.74	154.15	144.01	134.06	132.54	129.23	131.86
June	106.34	149.60	142.28	133.06	131.25	129.41	.....
July	101.19	148.23	139.71	132.39	130.35	129.91	.....
Aug.	113.25	150.26	142.10	133.14	129.98	129.95	.....
Sept.	115.66	153.67	140.06	133.84	129.41	131.38	.....
Oct.	118.01	155.02	140.87	134.05	129.73	132.81	.....
Nov.	124.06	154.63	141.17	134.96	128.18	133.38	.....
Dec.	132.36	155.60	142.02	135.23	126.89	133.51	.....

Source: Fairchild's Publications.

Average Prices of Twenty Industrial Stocks (Dow, Jones)

Month	1922	1923	1924	1925	1926	1927	1928
Jan.	82.57	99.42	100.66	123.60	159.00	156.56	203.40
Feb.	85.81	103.90	101.31	122.86	162.31	161.96	199.35
March	89.05	105.38	98.86	125.68	153.13	161.78	214.45
April	93.46	102.70	94.69	122.02	144.83	167.36	216.93
May	96.41	98.19	92.47	129.95	143.43	172.97	.....
June	96.36	97.24	96.37	131.01	154.03	171.98	.....
July	97.05	91.72	102.14	136.50	160.58	182.61	.....
Aug.	100.78	93.70	105.57	143.18	166.64	190.63	.....
Sept.	102.05	93.61	104.95	147.73	166.10	198.96	.....
Oct.	103.43	90.45	104.08	156.52	159.69	199.78	.....
Nov.	99.53	92.88	111.38	159.39	157.37	198.21	.....
Dec.	99.02	95.61	120.51	157.01	161.86	202.40	.....

Source: Standard Trade and Securities Service.

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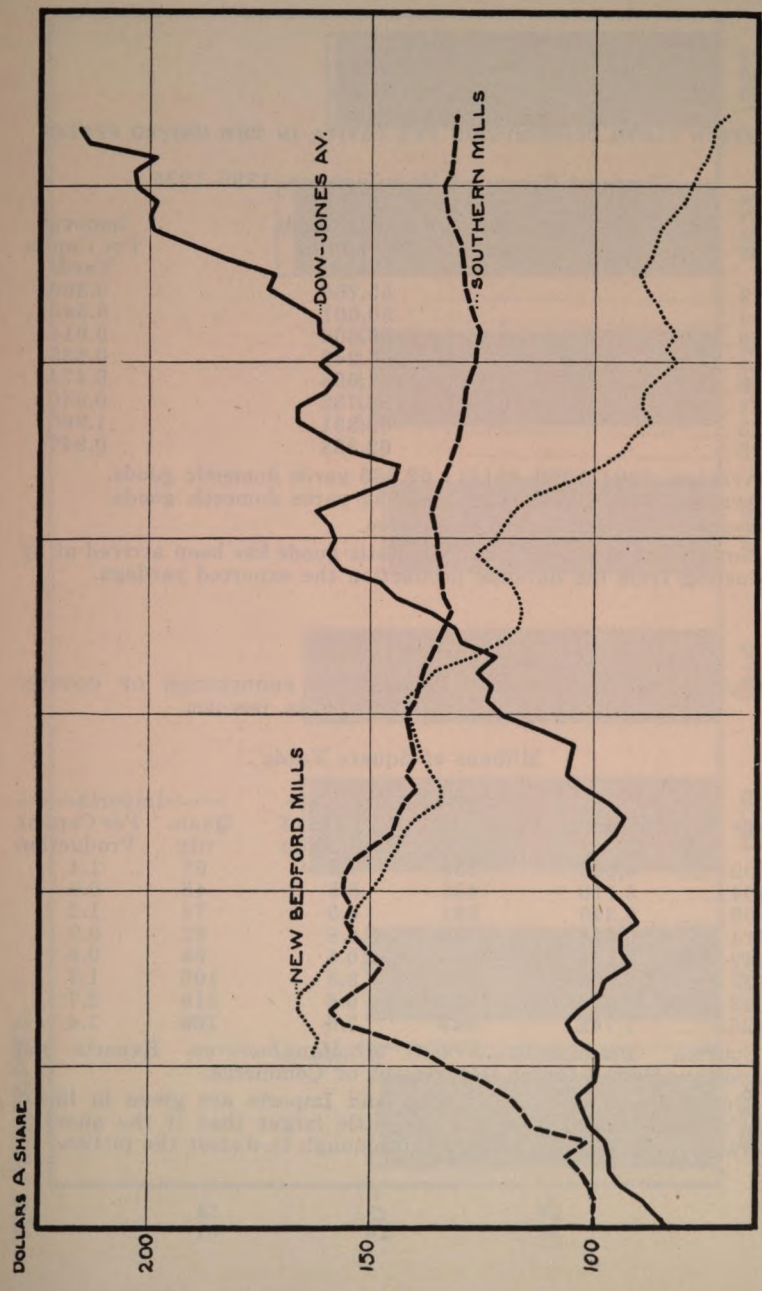

Exhibit VI. Value of Shares

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EXHIBIT VII

COTTON CLOTH CONSUMPTION PER CAPITA IN THE UNITED STATES

Years of Census of Manufactures, 1899–1925

Year	Domestic Goods Per Capita Yards	Imports Per Capita Yards
1899	55.766	0.869
1904	56.601	0.542
1909	65.806	0.814
1914	66.243	0.635
1919	53.658	0.474
1921	56.732	0.980
1923	69.831	1.960
1925	62.388	0.947

Average, 1904–1909–1914: 62.886 yards domestic goods.
Average, 1921–1923–1925: 62.984 yards domestic goods.

Source: Department of Commerce.

NOTE.—The consumption of domestic goods has been arrived at by deducting from the national production the exported yardage.

EXHIBIT VIII

RELATION OF IMPORTS AND EXPORTS TO PRODUCTION OF COTTON CLOTH IN THE UNITED STATES, 1899–1925

Millions of Square Yards

Year	Production	Exports		Imports	
		Quantity	Per Cent of Production	Quantity	Per Cent of Production
1899	4,523	352	7.8	65	1.4
1904	5,110	435	8.5	45	0.9
1909	6,349	381	6.0	74	1.2
1914	6,814	326	4.8	62	0.9
1919	6,317	683	10.4	50	0.8
1921	6,704	552	8.3	106	1.7
1923	8,264	465	5.6	219	2.7
1925	7,742	543	7.0	109	1.4

Sources: Production: *Census of Manufactures.* Exports and Imports: United States Department of Commerce.

NOTE.—Prior to 1923, Exports and Imports are given in linear yards. This figure is probably a little larger than if the quantity were given in square yards but not enough to distort the picture.

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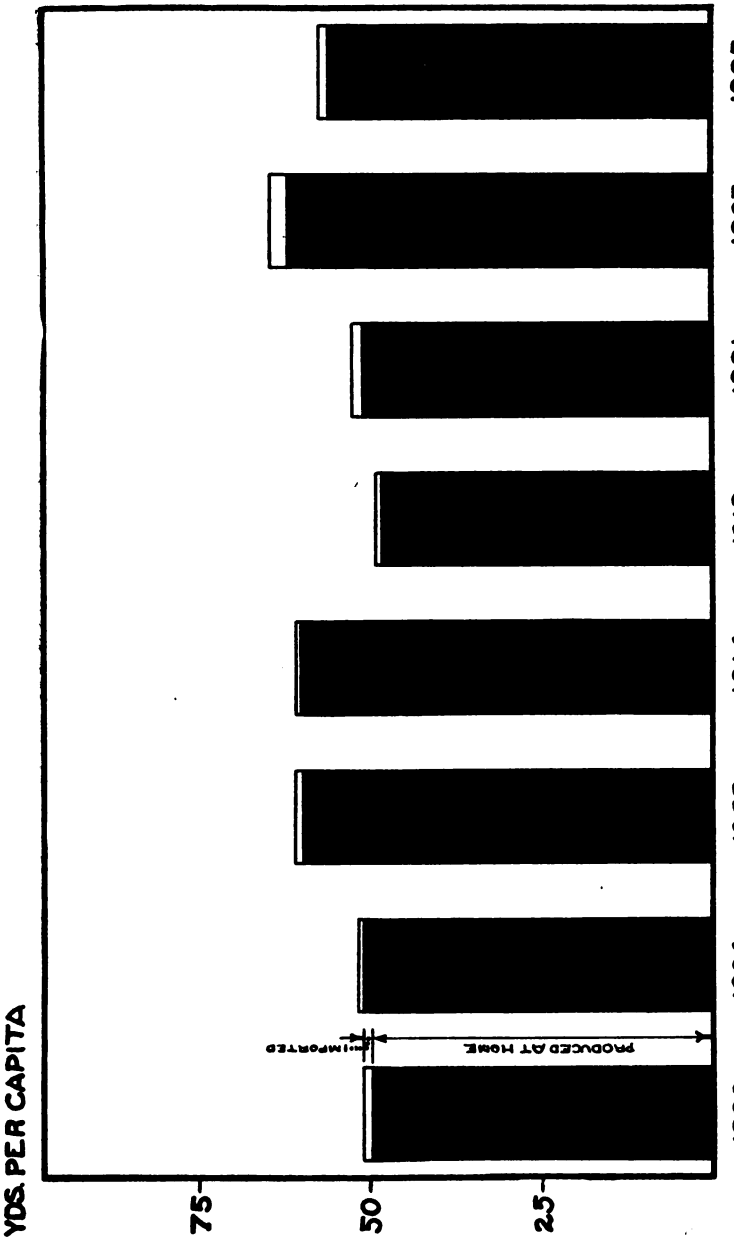

Exhibit VII—Cotton Cloth Consumption Per Capita in the United States

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EXHIBIT IX

ACTIVITY OF COTTON MANUFACTURING AND GENERAL INDUSTRIAL ACTIVITY, 1913–1927

Year	Index	
	Industrial Production	Cotton Consumption
1913	81.2	92.7
1914	67.1	91.2
1915	80.8	99.7
1916	101.2	110.1
1917	99.9	113.1
1918	97.0	102.5
1919	89.7	98.3
1920	94.2	97.0
1921	71.6	89.8
1922	93.2	101.1
1923	112.9	108.2
1924	104.9	91.7
1925	116.4	106.7
1926	120.2	111.9
1927	117.4	123.2

Base, January 1, 1923=100; not corrected for secular trend.
Source: Standard Trade and Securities Service.

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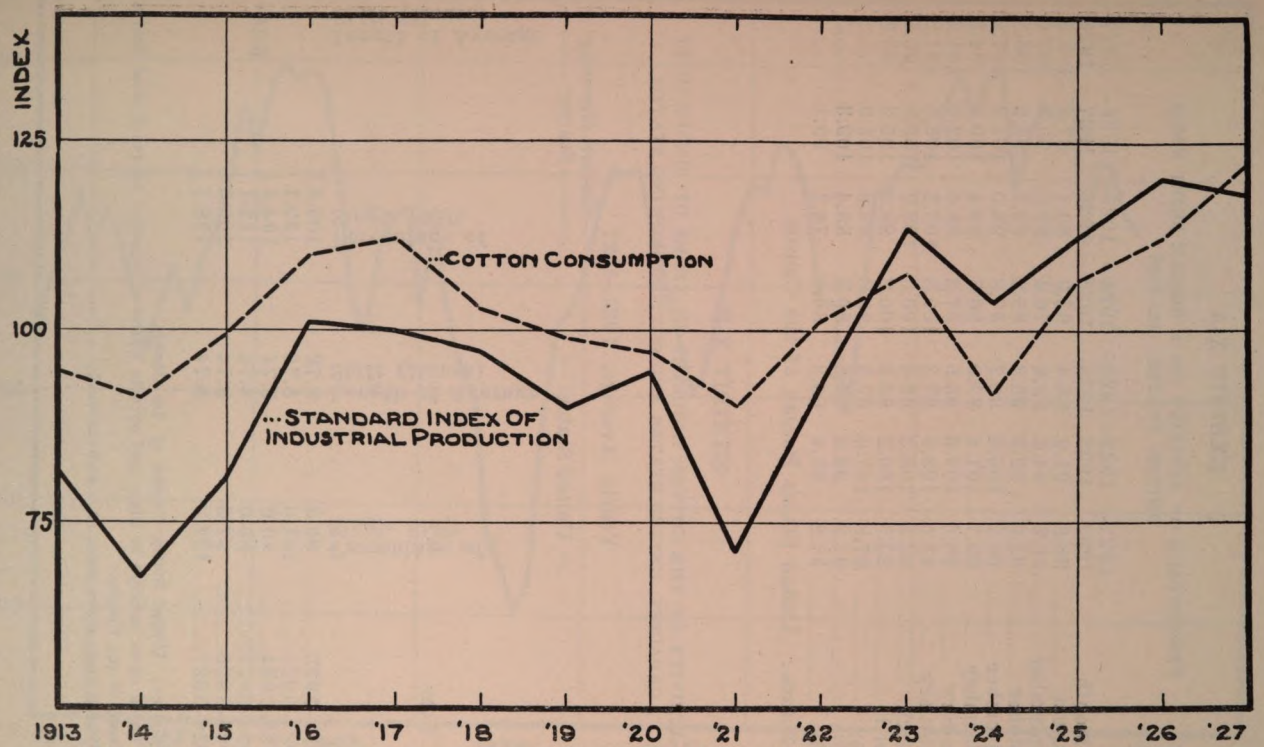

Exhibit IX—Activity of Cotton Manufacturing and General Industrial Activity, U. S. 1913–27

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EXHIBIT X-A

PERCENTAGE OF ACTIVITY ON A SINGLE SHIFT BASIS
UNITED STATES, 1921–1928

Month	1921–1922	1922–1923	1923–1924	1924–1925	1925–1926	1926–1927	1927–1928
August	83.8	91.9	85.4	63.0	80.1	87.4	103.5
September	90.6	94.2	93.6	76.4	83.8	98.5	107.0
October	92.0	99.2	95.8	86.2	89.5	98.9	105.3
November	98.2	106.5	96.7	87.8	96.0	101.3	107.2
December	92.7	101.4	87.0	90.7	99.4	100.7	94.3
January	96.6	107.6	95.5	97.2	98.6	102.0	101.5
February	93.5	109.6	87.3	100.5	103.2	106.5	101.2
March	89.3	108.3	82.4	100.0	102.2	109.8	96.8
April	83.5	109.2	80.0	100.2	98.2	105.6	94.8
May	87.8	107.6	67.5	93.8	88.9	108.9	-----
June	91.2	98.8	64.6	89.2	88.4	109.3	-----
July	87.2	87.4	60.3	84.6	78.7	99.1	-----

Source: United States Bureau of the Census.

EXHIBIT X-B

ACTIVITY OF THE COTTON INDUSTRY IN TERMS OF SINGLE-SHIFT CAPACITY, UNITED STATES AND COTTON-GROWING STATES

Yearly Average, 1921–1927

Year	United States[1]		Cotton-Growing States[2]	
	Percentage of Single Shift	Length of Average Shift (Hours)	Percentage of Single Shift	Length of Average Shift (Hours)
1921–1922	90.3	8.78	105.8	
1922–1923	101.8	8.76	120.1	
1923–1924	83.0	8.74	104.1	9.16[3]
1924–1925	89.0	8.74	112.1	
1925–1926	92.2	8.74	103.0	
1926–1927	102.3	8.74	118.1	

[1]Source: United States Bureau of the Census.

[2]Based upon spindles in place and spindle hours as reported by the United States Bureau of the Census.

[3]Based upon assumption of a 55-hour week.

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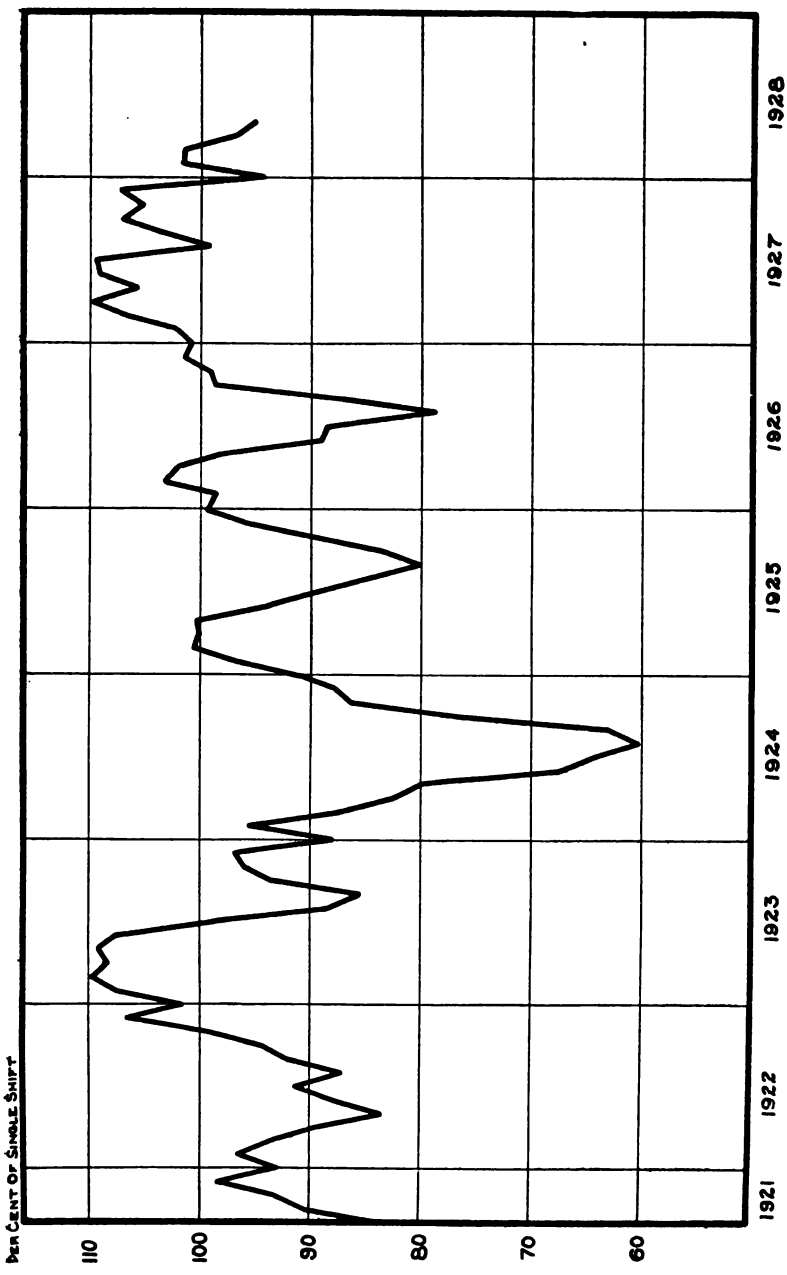

Exhibit X-A—Percentage of Activity on a Single Shift Basis, U. S. 1921-28

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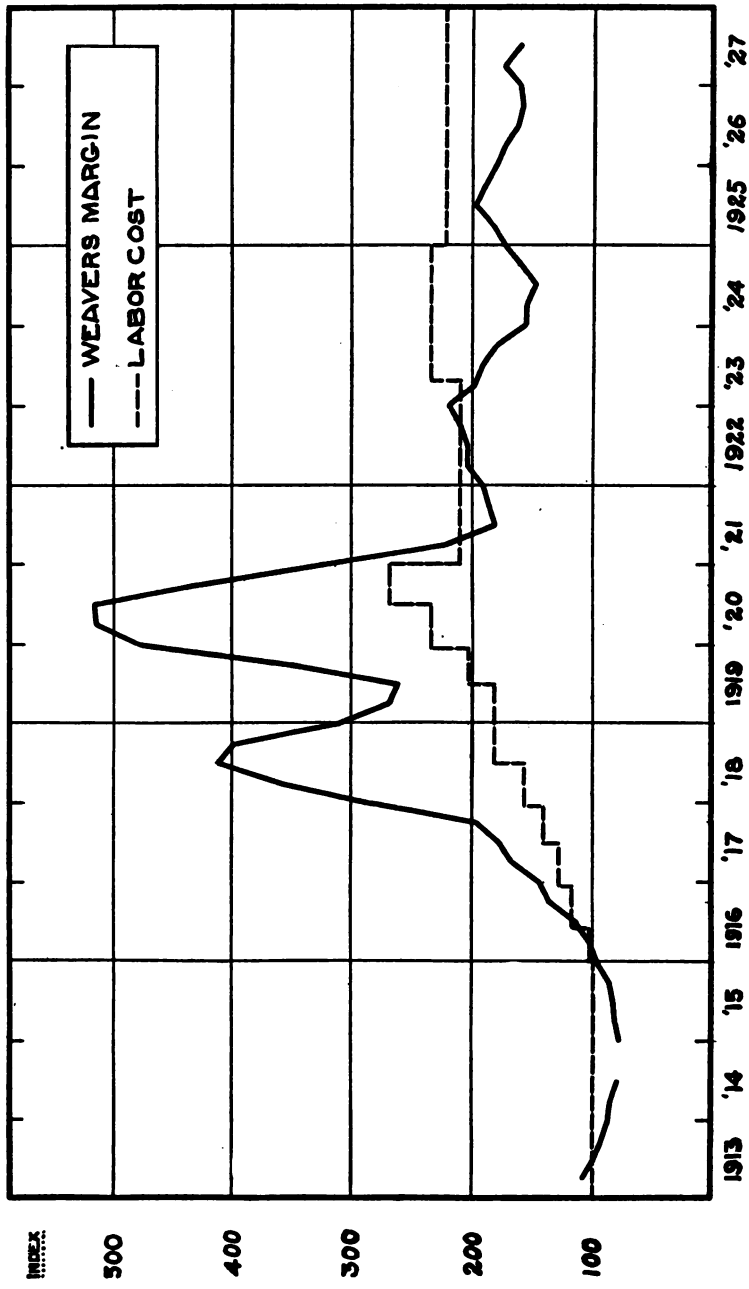

Exhibit XI—Weaver's Margin and Labor Cost Compared

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EXHIBIT XI

WEAVER'S MARGIN AND LABOR COST COMPARED, 1912–1927

Weaver's Margin:

Price of a pound of 64x60, 7.60 print cloth in Fall River; average for the first week of each quarter, as given by Pendergast & Co. less:

Average daily price of middling upland cotton for the first month of the quarter in New York. Source: Standard Trade and Securities Service.

Wages:

Weaver's wages (piece rate) in Fall River for weaving 47½ yards of 64x64, 7-yard print cloth; this may be taken as indicative of wage levels in Fall River. Source: National Association of Cotton Manufacturers' *Yearbook.*

Weaver's margin is represented by a four quarters' moving average, centered on the third quarter.

Both series are in form of relatives in terms of the 1913 average as 100.

		Weaver's Margin		Wages	
Year	Quarter	Index	4-quarter Moving Average	Date of Change	Index
1912	4	129.2	------	1-'12	100
1913	1	114.9	------	------	-----
	2	102.9	108.7	------	-----
	3	87.7	100.0	------	-----
	4	94.4	92.1	------	-----
1914	1	83.5	86.1	------	-----
	2	78.8–	84.9	------	-----
	3	83.0	79.8	------	-----
	4	------[1]	------[1]	------	-----
1915	1	73.8	76.8	------	-----
	2	71.6	80.6	------	-----
	3	94.1	81.6	------	-----
	4	86.7	86.9	------	-----
1916	1	95.2	97.6	1-'16	105.0
	2	113.2	102.6	5-'16	115.5
	3	115.1	112.8	------	-----
	4	127.6	133.4	12-'16	127.0
1917	1	177.7	143.1	------	-----
	2	151.9	165.7	6-'17	139.8
	3	205.4	179.3	------	-----
	4	182.1	195.6	12-'17	157.2

[1]New York Cotton Exchange temporarily closed.

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EXHIBIT XI *(Continued)*

WEAVER'S MARGIN AND LABOR COST COMPARED, 1912–1927

Year	Quarter	Weaver's Margin		Wages	
		Index	4-quarter Moving Average	Date of Change	Index
1918	1	243.1	281.3	----	----
	2	494.6	351.2	6-'18	180.8
	3	512.9	411.8	----	----
	4	396.4	395.9	----	----
1919	1	179.5	308.1	----	----
	2	143.7	268.4	6-'19	208.0
	3	354.0	262.5	----	----
	4	372.7	351.2	12-'19	233.9
1920	1	534.3	472.8	----	----
	2	630.0	513.3	6-'20	269.0
	3	516.3	514.7	----	----
	4	378.2	429.8	----	----
1921	1	194.6	313.8	1-'21	208.5
	2	166.2	220.9	----	----
	3	144.5	181.5	----	----
	4	220.7	182.4	----	----
1922	1	198.0	190.0	----	----
	2	196.9	205.0	----	----
	3	204.3	203.7	----	----
	4	215.6	210.4	----	----
1923	1	224.8	218.2	1-'23	234.6
	2	227.9	197.4	----	----
	3	121.3	190.0	----	----
	4	186.1	178.6	----	----
1924	1	178.9	154.1	----	----
	2	130.0	154.0	----	----
	3	121.1	149.6	----	----
	4	168.5	155.9	----	----
1925	1	204.0	171.1	1-'25	211.1
	2	190.7	182.3	----	----
	3	165.9	196.3	----	----
	4	224.4	189.9	----	----
1926	1	178.6	181.2	----	----
	2	156.0	172.0	----	----
	3	129.0	162.8	----	----
	4	187.6	158.3	----	----
1927	1	160.6	160.7	----	----
	2	165.5	171.9	----	----
	3	174.0	175.3	----	----
	4	201.0	----	----	----

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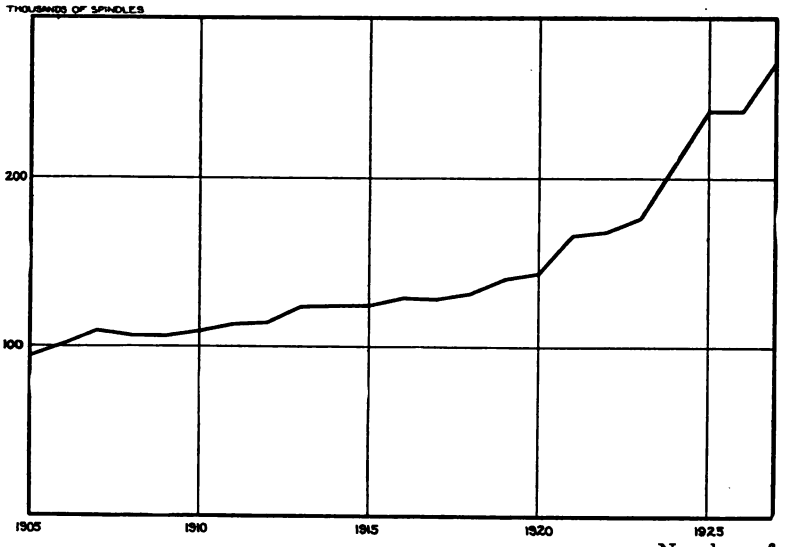
EXHIBIT XII-A

SPINDLES IN PLACE IN TEXAS, 1905–1927



Year	Number of Spindles
1905	94,390
1906	101,759
1907	109,892
1908	106,924
1909	106,528
1910	108,778
1911	113,100
1912	114,352
1913	123,908
1914	124,628
1915	124,848
1916	128,762
1917	128,112
1918	132,236
1919	140,054
1920	143,054
1921	166,468
1922	168,192
1923	176,444
1924	207,248
1925	239,596
1926	239,828
1927	268,848*

Source: Bureau of the Census.

*Including 22,000 spindles permanently idle.

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EXHIBIT XII-B

SPINDLE ACTIVITY, TEXAS AND ALL SOUTH

Year and Month	Million Spindle Hours — Texas	Million Spindle Hours — All South
1921		
Aug.	40.7	3,627
Sept.	38.5	3,792
Oct.	39.5	3,856
Nov.	40.3	4,059
Dec.	34.9	3,831
1922		
Jan.	43.3	4,190
Feb.	38.9	3,878
March	41.5	4,283
April	34.6	3,806
May	38.4	4,256
June	40.9	4,282
July	37.8	4,014
Aug.	43.5	4,398
Sept.	40.3	4,359
Oct.	42.0	4,568
Nov.	40.8	4,691
Dec.	40.5	4,241
1923		
Jan.	52.7	5,003
Feb.	49.0	4,573
March	56.2	5,121
April	53.6	4,803
May	53.3	5,117
June	48.1	4,709
July	37.0	4,193
Aug.	43.1	4,456
Sept.	43.4	4,410
Oct.	48.3	4,839
Nov.	48.0	4,654
Dec.	44.0	4,071
1924		
Jan.	47.1	5,024
Feb.	48.9	4,223
March	48.5	4,316
April	44.1	4,137
May	40.2	3,746
June	36.0	3,401
July	35.6	3,326
Aug.	36.7	3,356
Sept.	44.4	4,087
Oct.	48.9	4,858
Nov.	46.2	4,562
Dec.	50.4	4,625
1925		
Jan.	58.0	5,261
Feb.	57.5	4,787
March	67.6	5,187
April	64.1	5,130
May	61.5	4,832
June	62.6	4,725
July	54.6	4,504
Aug.	59.5	4,276
Sept.	66.9	4,376
Oct.	71.2	4,772
Nov.	65.5	4,885
Dec.	67.1	5,086
1926		
Jan.	70.6	5,291
Feb.	65.8	5,050
March	76.4	5,636
April	71.6	5,227
May	64.9	4,667
June	60.1	4,781
July	52.1	4,446
Aug.	60.8	4,879
Sept.	68.9	5,326
Oct.	68.1	5,310
Nov.	71.6	5,501
Dec.	73.0	5,405
1927		
Jan.	75.5	5,507
Feb.	72.5	5,295
March	86.9	6,091
April	81.1	5,655
May	83.9	5,797
June	84.3	5,854
July	78.0	5,285
Aug.	84.2	5,928
Sept.	79.5	5,796
Oct.	75.3	5,696
Nov.	75.1	5,824
Dec.	71.0	5,193
1928		
Jan.	72.8	5,672
Feb.	69.5	5,352
March	69.5	5,508
April	61.3	5,152

Source: United States Bureau of the Census.

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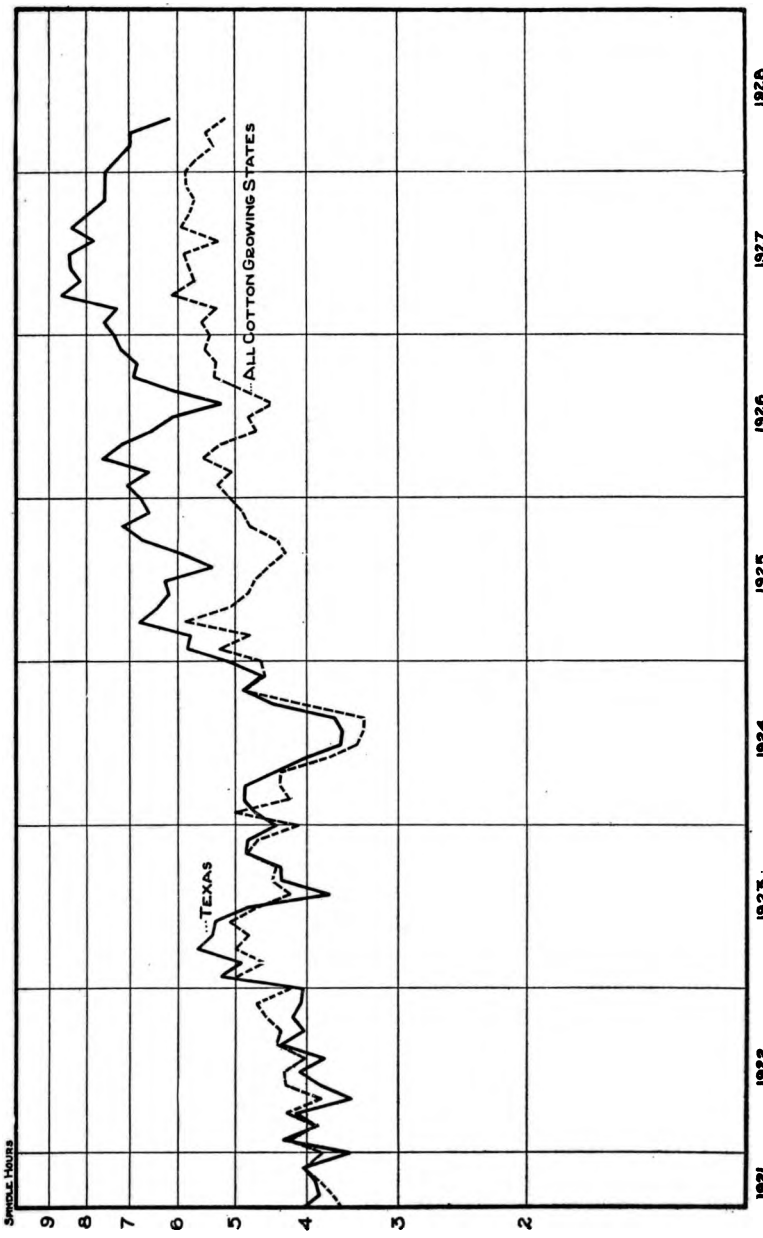

Exhibit XII–B.—Spindle Activity, Texas and all South

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EXHIBIT XIII

CAPITALIZATION AND PRODUCTS OF TEXAS COTTON MILLS

Location	Capitalization	Number of Spindles	Capitalization per Spindle	Types and Products
Belton	$500,000	12,000	$41.60	Yarn.
Bonham	----------	16,200	---------	Sheetings, Duck
Bowie	459,000	5,000	91.70	Twine
Brenham	250,000	6,500	38.50	Ducks, Osnaburg, Drills, Sheetings
Corsicana	500,000	15,500	32.20	Ducks and Osnaburgs
Cuero	270,000	8,300	32.55	Duck
Dallas	500,000	16,200	30.81	Duck and Drills
Dallas, Waco, and McKinney	6,000,000	41,130	146.00	Drills, Twills, Colored Goods, Denims
Denison	700,000	16,000	43.70	Duck and Drills
El Paso	600,000	5,000	120.00	Denims and Drills
Fort Worth	1,022,000	16,000	64.00	Cord Tire Fabrics
Gonzales	200,000	6,800	29.40	Ducks, Drills, and Osnaburgs
Hillsboro	300,000	6,500	46.20	Ducks and Osnaburgs
Houston	300,000	6,640	45.30	Blankets
Itasca	715,000	12,000	59.60	Duck, Drills, Osnaburgs
Mexia	450,000	5,000	90.00	Ducks and Osnaburgs
New Braunfels	1,500,000	10,000	150.00	Ginghams
Post	857,000	11,560	74.30	Sheetings
San Antonio	500,000	3,400	86.30	Tire Duck, Osnaburgs
Kingsville		2,448		Twine and Webbings
Sherman	100,000	7,956	12.59	Ducks
Waxahachie	375,000	10,000	37.50	Ducks and Osnaburgs
West	200,000	6,240	32.10	Ducks and Osnaburgs.

$16,316,000 excluding Bonham.

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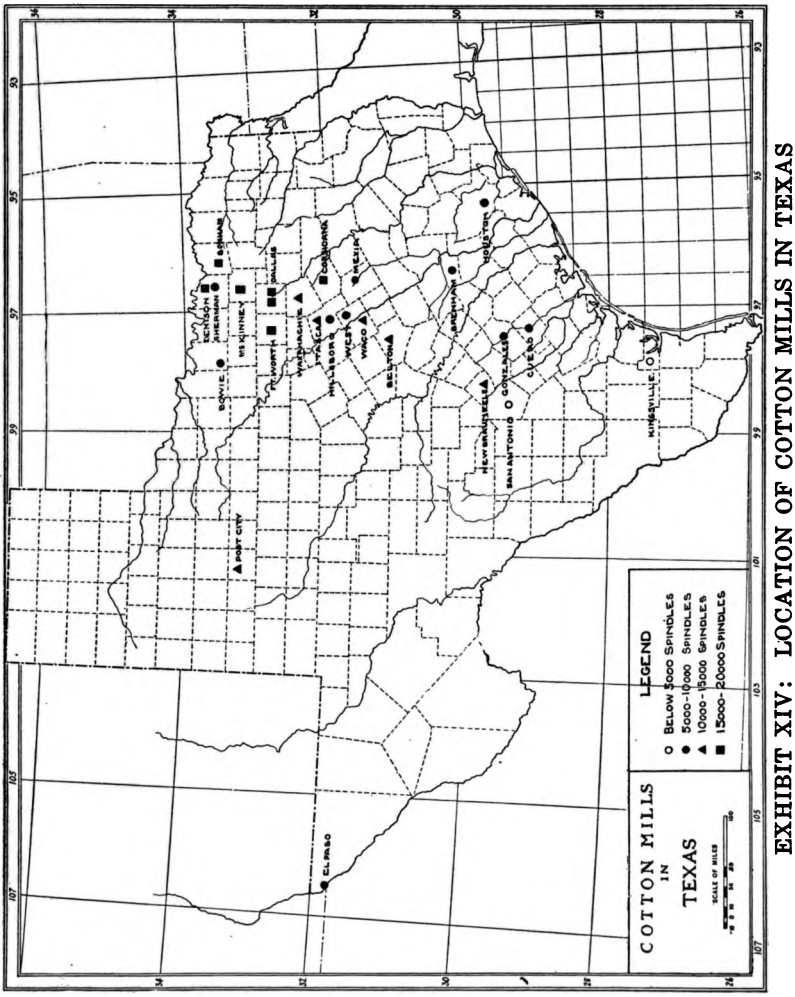

EXHIBIT XIV: LOCATION OF COTTON MILLS IN TEXAS

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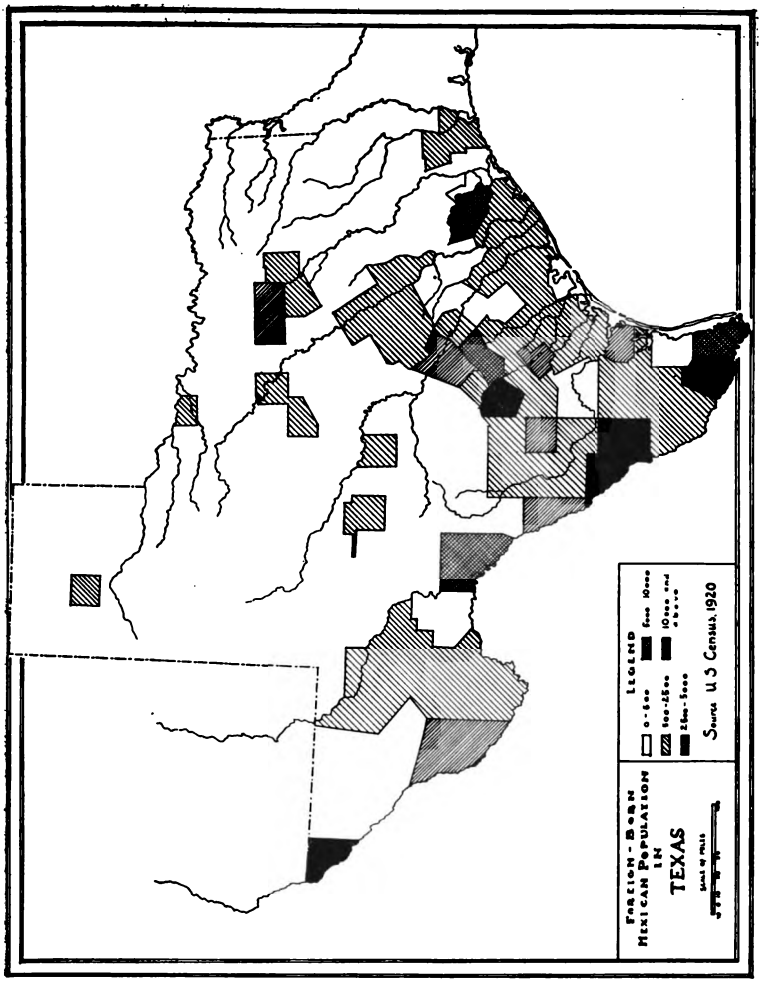

EXHIBIT XV: MEXICAN-BORN POPULATION BY COUNTIES IN 1920

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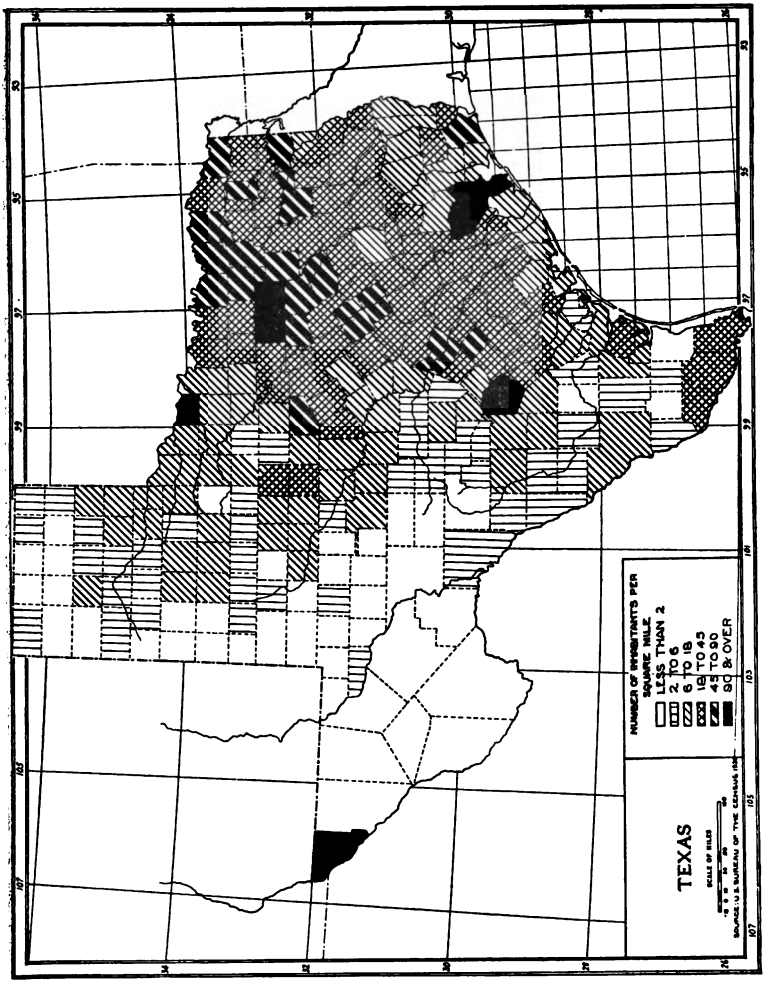

EXHIBIT XVI: DENSITY OF POPULATION, 1920

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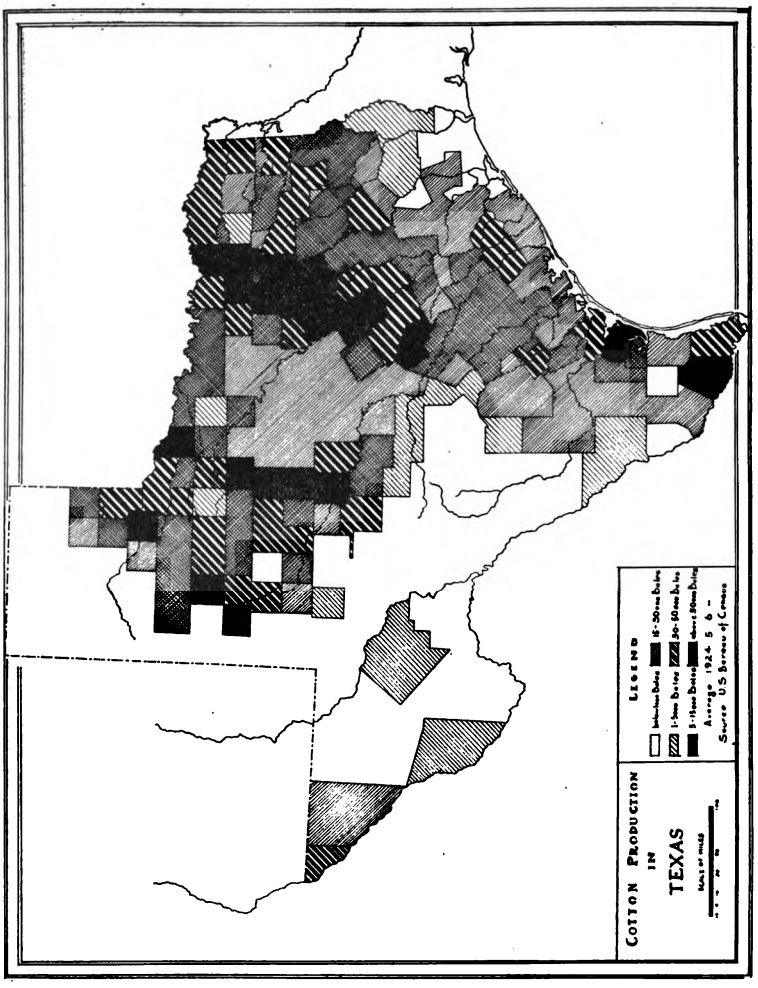

EXHIBIT XVII: COTTON PRODUCTION IN TEXAS, AVERAGE BY COUNTIES, 1924, 1925, 1926

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EXHIBIT XVIII

FREIGHT RATES ON COTTON GOODS: DALLAS, TEXAS; COLUMBUS, GA.; GREENVILLE, S.C.

Cents per Hundredweight

To:	From Texas Common Point Territory	From Columbus	Difference Texas Common Point Territory-Columbus	From Greenville	Difference Texas Common Point Territory-Greenville
Boston	115½	84	—31½	81	—34½
New York	95½	84	—11½	81	—34½
Philadelphia	95½	84	—11½	81	—34½
Akron	106½	83	—23½	98	—8½
Pittsburgh	145	103	—42	96	—49
Louisville	86	69½	—16½	83½	+2½
Chicago	83½	83	—½	98	+14½
St. Louis	83½	75	—8½	90	+6½
Kansas City	114½	123	+8½	128	+13½
Memphis	69	63½	—5½	77½	+8½
New Orleans	69	63½	—5½	78	+9
Dallas	----	204	+204	205½	+205½
Minneapolis	132½	128	—4½	143½	+11
Portland	295½	340	+44½	340½	+45
S. Francisco	258	318	+60	340½	+82½
Los Angeles	258	318	+60	340½	+82½

All rail, or water and rail, whichever is cheaper: Boston, New York, and Philadelphia, water and rail. All others, all rail.

Rates for any quantity on cotton piece goods in original piece.

Tariff authority: Agent S. E. Johnson's I. C. C. 1955–2007; Agent H. C. Toll's I. C. C. 1192–1194; Agent I. H. Glenn's I. C. C. A-512; Agent J. J. Carroll's I. C. C. 466.

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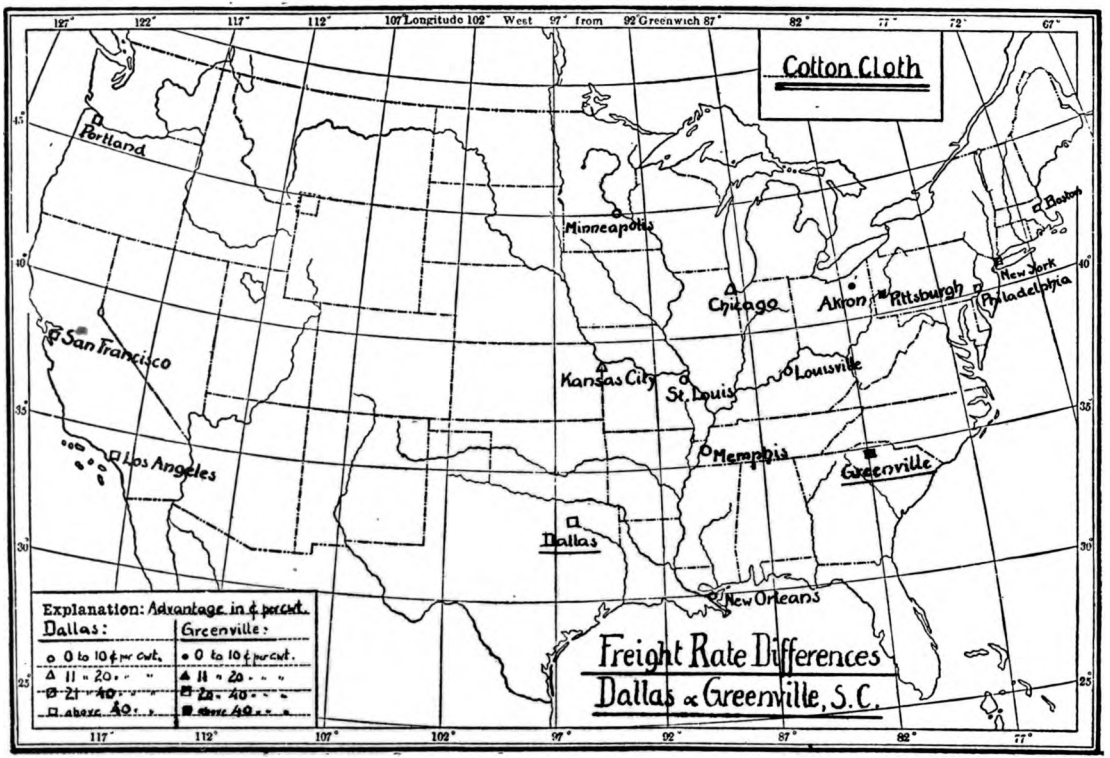

EXHIBIT XVIII: a.

NOTE.—Dallas is taken as representative of the Texas common point territory.

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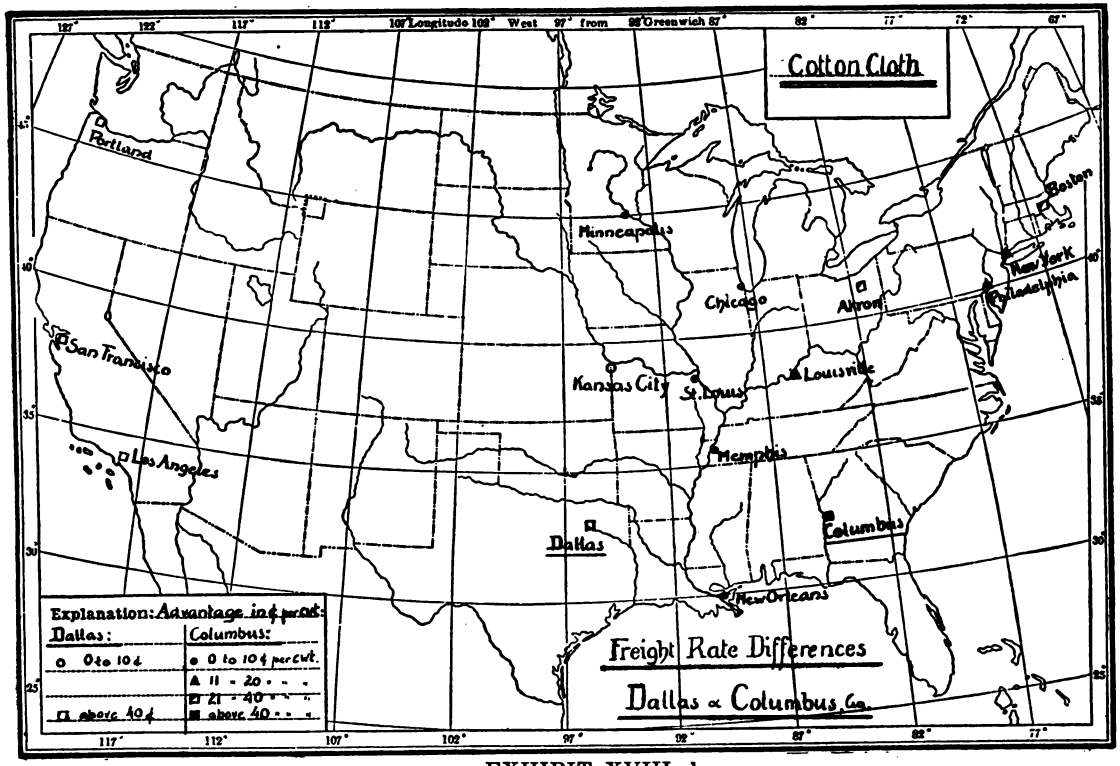

EXHIBIT XVIII: b

NOTE.—Dallas is taken as representative of the Texas common point territory.

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